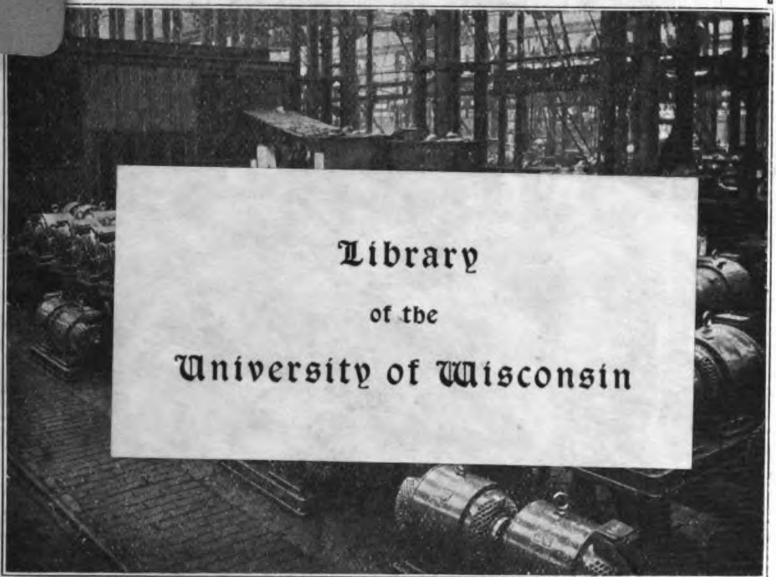
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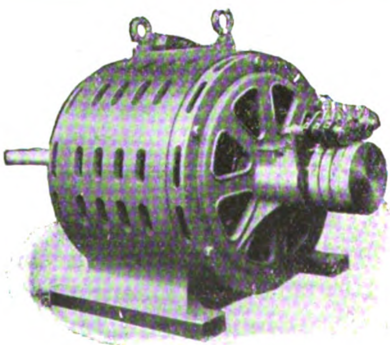


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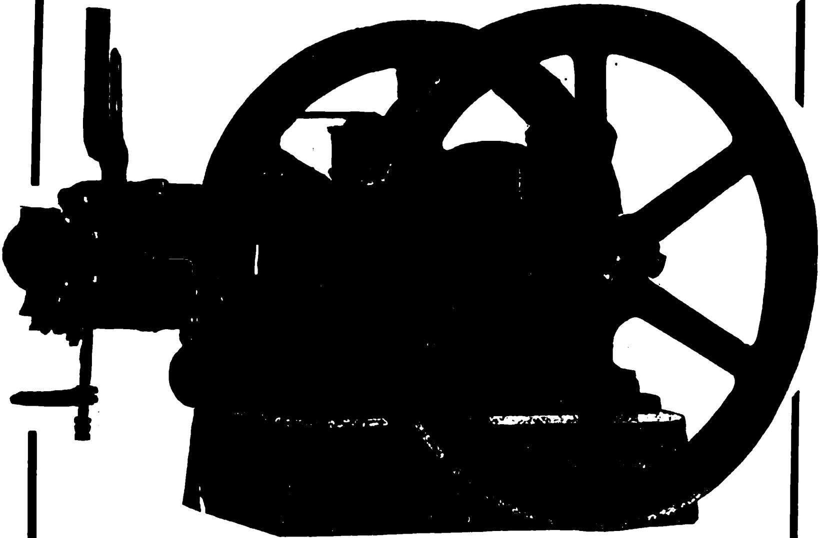
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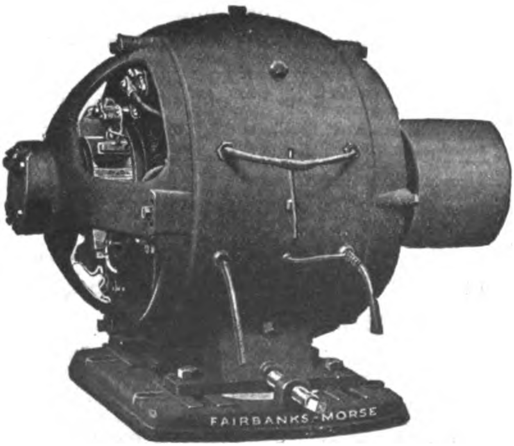
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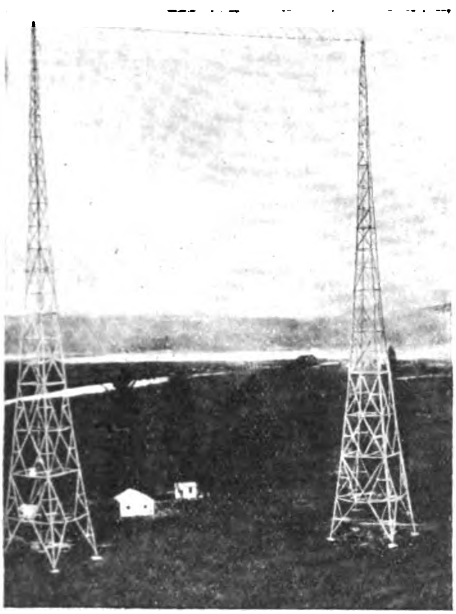
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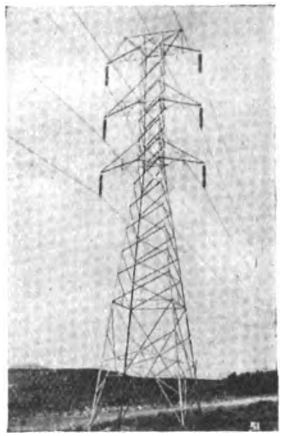
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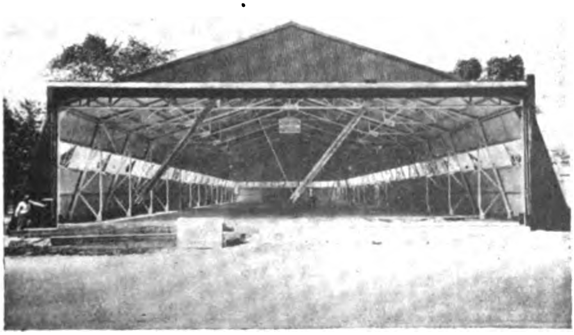


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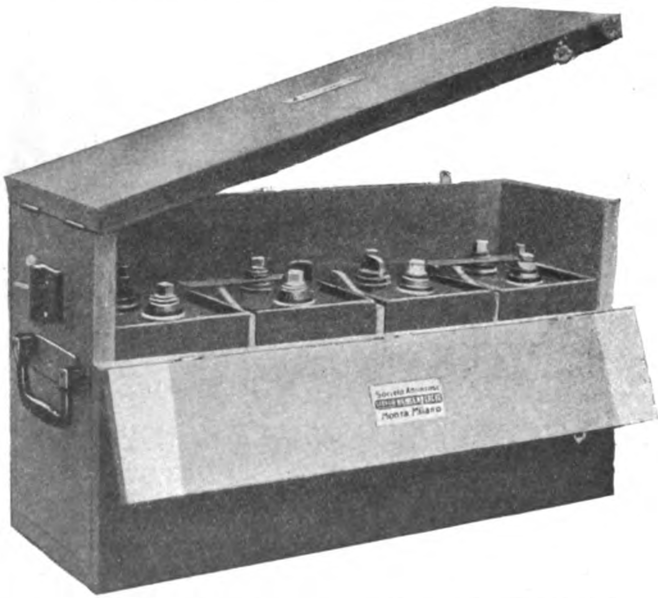
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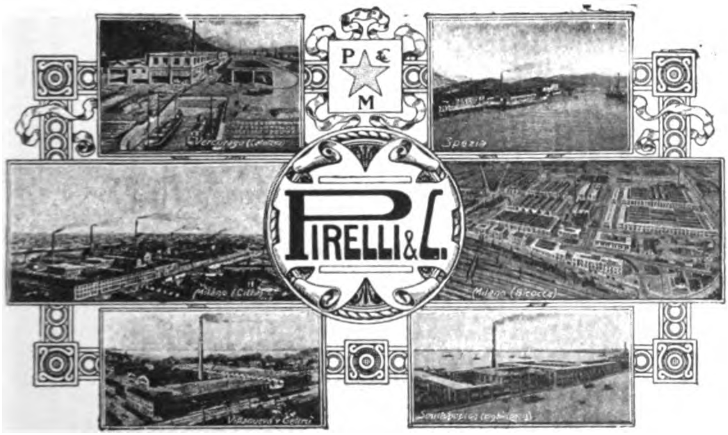
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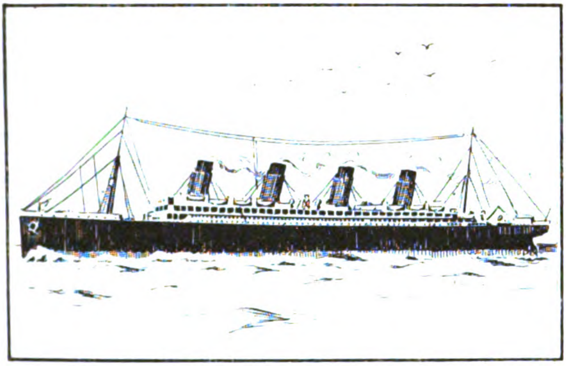
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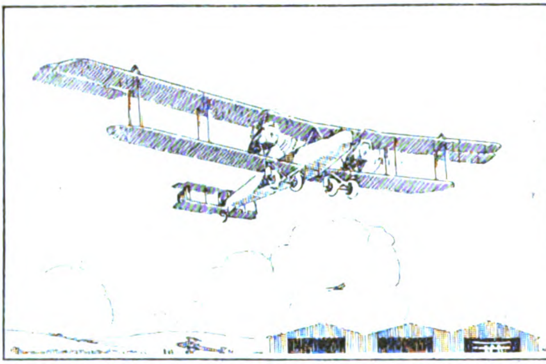
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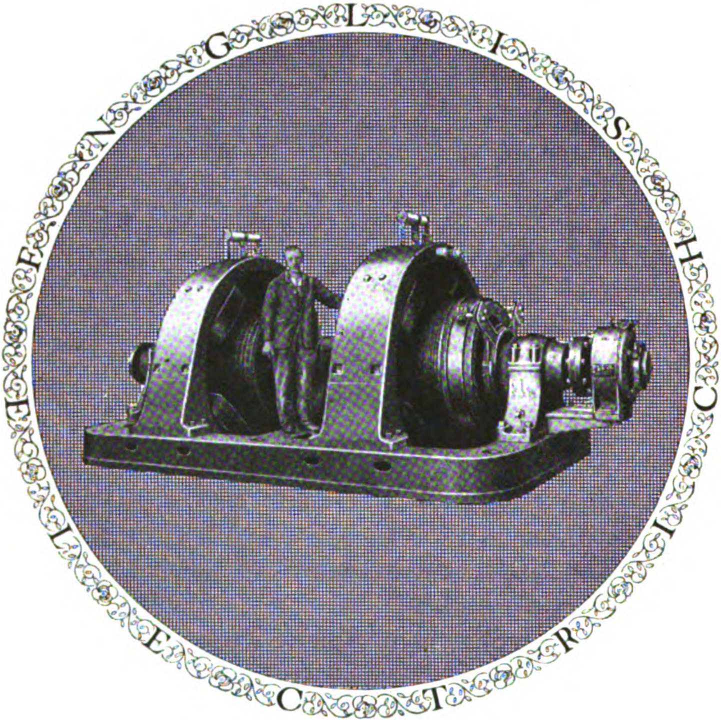
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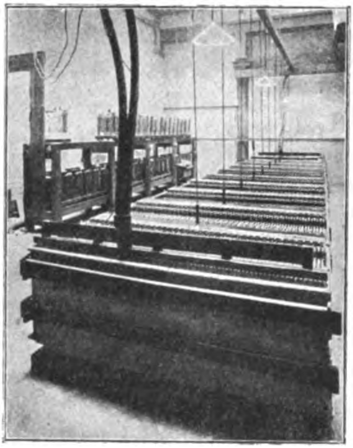
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Note.—The land and ship stations are not included in this index. They are grouped together under the countries in which the land stations are erected or to which the ships belong, and these countries are arranged in the section in alphabetical order. The call letters are also arranged alphabetically in a special section.

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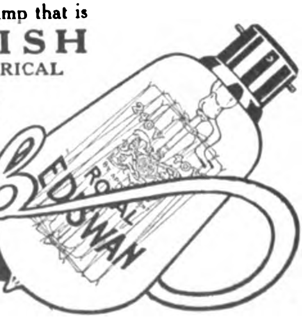
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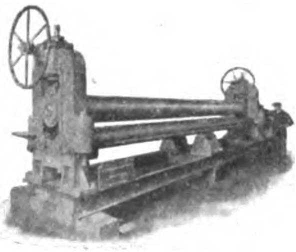
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PREFACE

FOR the eighth year in succession we have pleasure in presenting to the public our YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, enlarged in scope, and novel in many of its features.

A slight rearrangement has been made with regard to the matter included in the CALENDAR. All items relating to wireless "happenings" have been transferred to the RECORD OF DEVELOPMENT. This alteration has enabled us to make the CALENDAR more general in character. It is also much improved by the inclusion of the hours of sunrise and sunset in the meridian of Greenwich, and the phases of the moon. The JEWISH, MOHAMMEDAN and OLD STYLE CALENDARS still find a place, whilst the list of OFFICIAL HOLIDAYS in various countries has been carefully revised and considerably amplified.

The section devoted to the RECORD OF DEVELOPMENT, as its title foretells, constitutes a carefully compiled record of all matters dealing with wireless telegraphy and telephony since their inception. It has been thoroughly brought up to date by Dr. N. W. McLachlan. Mr. Philip R. Coursey, B.Sc., has written a very full account of the development of wireless during the past year, and this properly finds a place at the end of the RECORD OF DEVELOPMENT.

We believe that we have supplied a long felt want in presenting the LAWS AND REGULATIONS in their new and concise form. A great deal of extra matter has been included.

In response to continued demands on the part of our readers, we have interspersed the LAWS AND REGULATIONS section with a series of small sketch maps indicating the position of wireless stations. These are incorporated with the particulars of the country or district which they represent. It is felt that the somewhat cumbersome chart, which until this year has found a place at the end of our volume, has been advantageously superseded by these smaller maps.

The lists of LAND AND SHIP STATIONS and their call-letters, which have formed so important a feature of previous editions of the YEAR-BOOK, are again reprinted, after having been thoroughly revised and brought up to date.

An innovation has been made in the 1920 volume, under the SPECIAL ARTICLES section, by the inclusion of a series of national *résumés* covering the past year's progress in the science of Wireless Telegraphy

and Telephony, and embracing a number of countries which have devoted considerable energy to their research and development. These *résumés*, we trust, will present to the reader in clear and concise form the past year's technical "wireless" happenings of the countries represented, and it is hoped to make the section a regular feature of our annual.

A number of special articles by scientists eminent in the radio-telegraphic and telephonic field are also presented.

Another innovation is the co-ordination of all meteorological data into one section. This work has been placed in the capable hands of Lt.-Col. E. Gold, D.S.O., F.R.S., the Assistant Director of the Meteorological Office, whilst Mr. A. R. Hinks, M.A., F.R.S., the Secretary of the Royal Geographical Society, has contributed the "Time" portion of the section. The BEAUFORT SCALE and BAROMETRIC AND THERMOMETRIC TABLES, which were formerly located in the USEFUL DATA section, have been transferred to this section.

Mr. E. V. Appleton, M.A., B.Sc., has undertaken a very exhaustive revision of the DEFINITIONS AND DICTIONARY OF TECHNICAL TERMS, and these have been amalgamated under the general title "WIRELESS TERMINOLOGY," with sub-headings (*a*) Definitions and (*b*) Foreign Equivalents.

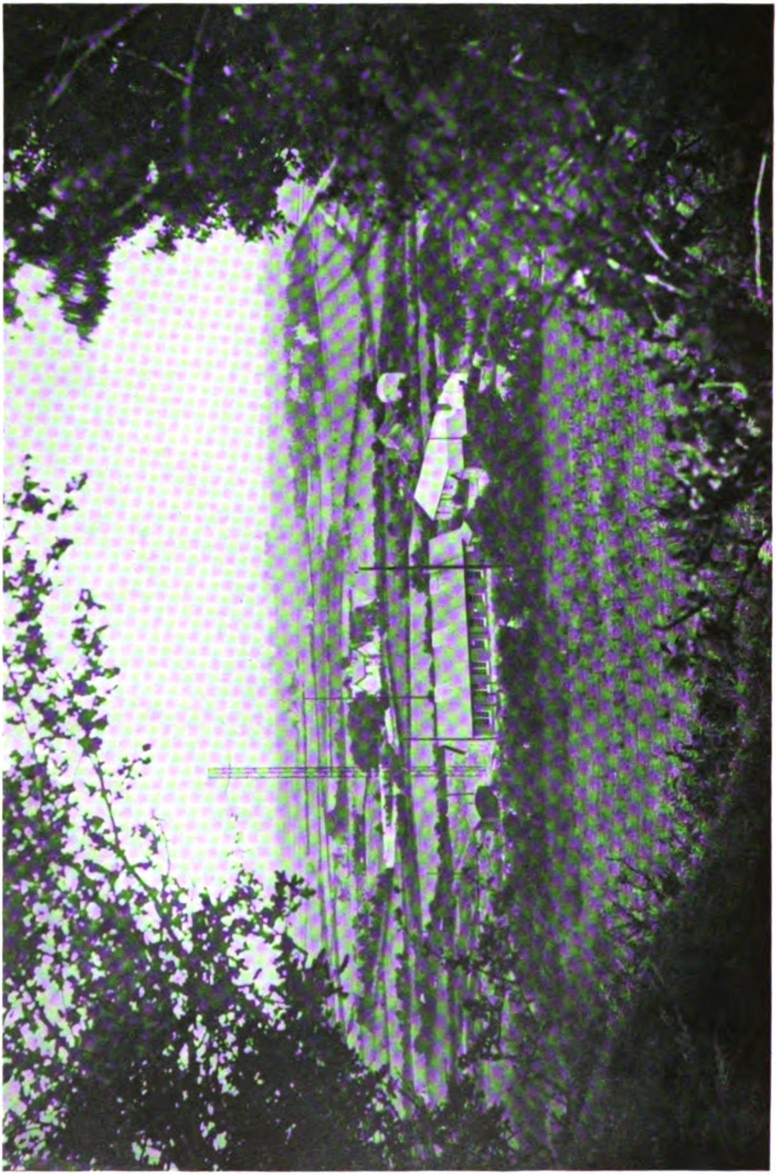
The particulars of WIRELESS COMPANIES, BIOGRAPHICAL NOTICES, LITERATURE OF WIRELESS TELEGRAPHY, DIRECTORY OF WIRELESS SOCIETIES and MORSE CODE sections have all been brought thoroughly up to date.

AVIATION has made such rapid strides since the commencement of the late world war that it has been deemed advisable to devote a section of our book to the application of Wireless Telegraphy and Telephony to this science. Organised and supervised by an expert, it has been prefixed by a most able article from the pen of Major Robert Orme, B.A., and incorporates a list of AERODROMES FITTED WITH WIRELESS, a list of AVIATION, IDENTIFICATION AND CALL LETTERS, and other useful particulars.

Before concluding this Preface, we desire to express our indebtedness to the many friends and correspondents, both at home and abroad, who have contributed their quota in making this 1920 volume of our annual the success we believe it to be.

THE EDITOR.

12/13, Henrietta Street,
Strand, London, W.C.2.
31*st March*, 1920.



GENERAL VIEW OF TOWYN WIRELESS STATION.

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CALENDAR
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(B) Jewish, Mohammedan, Greek and Coptic Calendars.

(C) List of the World's Official Holidays.

(D) General and Astronomical Notes.

(E) Tabular Calendars for 1919 and 1921.

JANUARY, 1920

PHASES OF THE MOON.

			h.	m.			h.	m.
Jan. 5	○	Full Moon	9	4·9	Jan. 20	● New Moon	17	26·9
12	☾	*Last Quarter*	12	8·6	28	☽ *First Quarter*	3	38·0

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	Th	Prof. Hertz died, 1894.	8 8	3 59
2	F	Rudolf Clausius born, 1822; died August 24th, 1888.	8 8	4 0
3	S	Capitulation of Port Arthur, 1905.	8 8	4 1
4	S	**2nd Sunday after Christmas**	8 8	4 2
5	M		8 7	4 3
6	T	**Epiphany.** Twelfth day.	8 7	4 4
7	W		8 7	4 5
8	Th	Evacuation of Gallipoli, 1916.	8 6	4 7
9	F	International Conference for Safety of Life at Sea closed, 1914.	8 6	4 8
10	S	British Penny Postage established, 1840.	8 5	4 9
11	S	**1st Sunday after Epiphany**	8 5	4 11
12	M	Marshal Joffre born, 1852. HILARY LAW SITTINGS BEGIN.	8 4	4 12
13	T	*St. Hilary.*	8 4	4 14
14	W		8 3	4 15
15	Th	British Museum opened, 1759.	8 2	4 17
16	F	Sir E. H. Shackleton reaches magnetic South Pole, 1909.	8 1	4 18
17	S	Benjamin Franklin born, 1706; died April 17th, 1790.	8 0	4 20
18	S	**2nd Sunday after Epiphany**	8 0	4 21
19	M	First German air raid by Zeppelins, 1915.	7 59	4 23
20	T	"Safety of Life at Sea" Convention signed at London, 1914.	7 58	4 25
21	W		7 57	4 26
22	Th	Queen Victoria died, 1901.	7 55	4 28
23	F	*Republic* wrecked, 1909. Passengers and crew saved.	7 54	4 30
24	S	Naval Battle off Dogger Bank, 1915.	7 53	4 31
25	S	**3rd Sunday after Epiphany**	7 52	4 33
26	M	Death of General Gordon and Fall of Khartoum, 1885.	7 51	4 35
27	T	William II., ex-German Emperor, born, 1859.	7 49	4 37
28	W	Röntgen Rays discovered, 1896.	7 48	4 38
29	Th	Capitulation of Paris, 1871.	7 47	4 40
30	F	Anglo-Japanese Treaty signed, 1902.	7 45	4 42
31	S	*Great Eastern* steamer launched, 1858.	7 44	4 44

FEBRUARY, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Feb. 3	◯	Full Moon	20 42·4	Feb. 19	●	New Moon	9 34·8
11	☾	*Last Quarter*	8 49·2	26	☽	*First Quarter*	11 49·5

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	**S**	**Septuagesima Sunday**	7 42	4 46
2	M	*Candlemas.*	7 41	4 47
3	T	Telegraphs transferred to Government, 1870.	7 39	4 49
4	W		7 38	4 51
5	Th	Thomas Carlyle died, 1881.	7 36	4 53
6	F	Board of Trade warnings initiated, 1861.	7 34	4 55
7	S	Chas. Dickens born, 1812; died June 9th, 1870.	7 33	4 56
8	**S**	**Sexagesima Sunday**	7 31	4 58
9	M	Sir Edward Carson born, 1854.	7 29	5 0
10	T	Lord C. Beresford born, 1846.	7 27	5 2
11	W	T. A. Edison born, 1847. London University founded, 1826.	7 26	5 4
12	Th		7 24	5 6
13	F		7 22	5 7
14	S	*St. Valentine.* Russia abandons the Allies, 1918.	7 20	5 9
15	**S**	**Quinquagesima Sunday** Sir Wm. Preece born, 1834.	7 18	5 11
16	M		7 16	5 13
17	T	*Shrove Tuesday.*	7 15	5 15
18	W	**Ash Wednesday**	7 13	5 17
19	Th	Alessandro Volta born, 1745; died March 5th, 1827.	7 11	5 18
20	F	Battle of Verdun begun, 1916.	7 9	5 20
21	S	Fall of Jericho, 1918.	7 6	5 22
22	**S**	**1st Sunday in Lent** Prof. Hertz born, 1857.	7 4	5 24
23	M	Johann Karl Friedrich Gauss died, 1855.	7 2	5 26
24	T	British captured Kut-el-Amara, 1917.	7 0	5 28
25	W	Sir Christopher Wren died, 1723.	6 58	5 29
26	Th	*La Provence* sunk in Mediterranean, 1916. 870 persons saved.	6 56	5 31
27	F	Battle of Majuba, 1881.	6 54	5 33
28	S	Relief of Ladysmith, 1900.	6 52	5 35
29	**S**	**2nd Sunday in Lent**	6 50	5 36

MARCH, 1920

PHASES OF THE MOON.

Date		Phase	h. m.	Date		Phase	h. m.
Mar. 4	○	Full Moon	9 12·6	Mar. 19	●	New Moon	22 55·8
12	☾	*Last Quarter*	5 57·4	26	☽	*First Quarter*	18 45·1

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	M	*St. David.*	6 48	5 38
2	T	*St. Chad.*	6 46	5 40
3	W	Dr. Alexander Bell born, 1847.	6 43	5 42
4	Th	Inauguration Day, U.S.A.	6 41	5 43
5	F	Alessandro Volta died, 1827.	6 39	5 45
6	S		6 37	5 47
7	**S**	**3rd Sunday in Lent**	6 35	5 49
8	M	Royal Institution founded, 1799.	6 32	5 50
9	T	Battle of Vimy Ridge, 1917.	6 30	5 52
10	W	Battle of Neuve Chapelle, 1915.	6 28	5 54
11	Th	Baghdad captured, 1917.	6 26	5 56
12	F	John F. Daniell born, 1790; died March 13th, 1845.	6 23	5 57
13	S	General Sir H. C. O. Plumer born, 1857.	6 21	5 59
14	**S**	**4th Sunday in Lent**	6 19	6 1
15	M	Abdication of Czar, 1917.	6 17	6 2
16	T	Georg Simon Ohm born, 1787; died July 7th, 1854. Senatore G. Marconi married at St. George's, Hanover Square, to the Hon. Beatrice O'Brien, 1905.	6 14	6 4
17	W	*St. Patrick.*	6 12	6 6
18	Th	Dardanelles naval attack, 1915.	6 10	6 8
19	F	First meeting of Empire War Cabinet, 1917.	6 8	6 9
20	S	Sir Isaac Newton died, 1727; born December 25th (O.S.), 1642.	6 5	6 11
21	**S**	**5th Sunday in Lent** Battle of Cambrai, 1918.	6 3	6 13
22	M	Battle of St. Quentin, 1918.	6 1	6 14
23	T		5 58	6 16
24	W	*Sussex* torpedoed, 1916.	5 56	6 18
25	Th	Slave trade abolished, 1807.	5 54	6 19
26	F	Battle of Gaza, 1917.	5 52	6 21
27	S	English Channel spanned by wireless, 1899. Wm. Konrad von Röntgen born, 1845.	5 49	6 23
28	**S**	**Palm Sunday**	5 47	6 24
29	M		5 45	6 26
30	T		5 42	6 28
31	W	Robert Wilhelm Bunsen born, 1811; died August 6th, 1899. HILARY LAW SITTINGS END.	5 40	6 29

APRIL, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Apr. 2	○	Full Moon	22 54·7	Apr. 18	●	New Moon	9 43·1
11	☾	*Last Quarter*	1 24·2	25	☽	*First Quarter*	1 27·5

			SUN. Rises. h. m.	Sets. h. m.
1	Th	*Maundy Thursday.*	5 38	6 31
2	F	**Good Friday**	5 36	6 33
3	S		5 33	6 34
4	**S**	**Easter Day**	5 31	6 36
5	M	**Easter Monday**	5 29	6 38
6	T	**Easter Tuesday** Prof. Adolf Slaby died, 1913; born, 1850. Commander Peary reached North Pole, 1909.	5 27	6 39
7	W	United States declared war on Germany, 1917.	5 24	6 41
8	Th	Anglo-French Convention signed, 1904.	5 22	6 43
9	F	Vimy Ridge taken, 1917.	5 20	6 44
10	S		5 18	6 46
11	**S**	**Low Sunday**	5 16	6 48
12	M	Albert Medal (Royal Society of Arts) presented to Senatore G. Marconi, 1914.	5 13	6 49
13	T	EASTER LAW SITTINGS BEGIN.	5 11	6 51
14	W	President Lincoln assassinated, 1865.	5 9	6 53
15	Th	*Titanic* disaster, 1912; over 700 lives saved.	5 7	6 54
16	F	Second Battle of the Aisne, 1917.	5 5	6 56
17	S	Russians captured Trebizond, 1916.	5 3	6 58
18	**S**	**2nd Sunday after Easter** Earthquake and fire at San Francisco, 1906.	5 1	6 59
19	M	Lord Beaconsfield died, 1881.	4 58	7 1
20	T	Torpedo-boat action off Dover, 1917.	4 56	7 3
21	W		4 54	7 4
22	Th	Foundation of Royal Society, 1662.	4 52	7 6
23	F	Shakespeare died, 1616.	4 50	7 8
24	S	Russo-Turkish War begun, 1877.	4 48	7 9
25	**S**	**3rd Sunday after Easter** Senatore Guglielmo Marconi, G.C.V.O., born, 1874.	4 46	7 11
26	M	Allied Troops land at Gallipoli, 1915.	4 44	7 13
27	T	Samuel F. B. Morse born, 1791; died, 1872.	4 42	7 14
28	W	Prof. Guthrie Tate born, 1831; died July 4th, 1901.	4 40	7 16
29	Th	Surrender to Turks at Kut, 1916.	4 38	7 17
30	F	Johann Karl Friedrich Gauss born, 1777; died February 23rd, 1855.	4 36	7 19

MAY, 1920

PHASES OF THE MOON.

			h. m.				h. m.
May 2	○	Full Moon	13 47·3	May 17	●	New Moon	18 25·2
10	☾	*Last Quarter*	17 51·0	24	☽	*First Quarter*	9 7·2

Day			Sun Rises h. m.	Sun Sets h. m.
1	S	Duke of Connaught born, 1850.	4 34	7 21
2	**S**	**4th Sunday after Easter**	4 33	7 22
3	M	Jamaica discovered, 1494.	4 31	7 24
4	T	Italy denounced Treaty of Triple Alliance, 1915.	4 29	7 26
5	W	Napoleon I. died, 1821; born August 15th, 1769.	4 27	7 27
6	Th	Accession of King George V., 1910.	4 25	7 29
7	F	*Lusitania* torpedoed, 1915.	4 24	7 30
8	S	Eruption at Martinique, 1902.	4 22	7 32
9	**S**	**Rogation Sunday**	4 20	7 33
10	M	Imperial Institute, London, opened, 1893.	4 19	7 35
11	T		4 17	7 37
12	W	Halley's comet appeared, 1910. Windhuk wireless station captured, 1915.	4 15	7 38
13	Th	**Ascension Day**	4 14	7 40
14	F		4 12	7 41
15	S	Presentation of Franklin Medal to Senatore Marconi, 1918.	4 11	7 43
16	**S**	**Sunday after Ascension**	4 9	7 44
17	M	Mafeking relieved, 1900.	4 8	7 46
18	T	New Eddystone Lighthouse opened, 1882.	4 6	7 47
19	W	Last Air Raid, London, 1918.	4 5	7 48
20	Th	Christopher Columbus died, 1506.	4 4	7 50
21	F	Manchester Ship Canal opened, 1894.	4 2	7 51
22	S		4 1	7 53
23	**S**	**Whit Sunday**	4 0	7 54
24	M	**Whit Monday** Empire Day.	3 59	7 55
25	T	**Whit Tuesday** Lloyd's incorporated, 1871.	3 58	7 57
26	W		3 57	7 58
27	Th	*Majestic* torpedoed, 1915.	3 55	7 59
28	F		3 54	8 0
29	S	*Empress of Ireland* disaster, 1914; 541 lives saved.	3 53	8 2
30	**S**	**Trinity Sunday**	3 53	8 3
31	M	Battle of Jutland, 1916.	3 52	8 4

JUNE, 1920

PHASES OF THE MOON.

		h. m.			h. m.
June 1	Full Moon	5 18·2	June 22	*First Quarter*	18 49·5
9	*Last Quarter*	6 58·5	30	Full Moon	20 40·7
16	New Moon	1 41·3			

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	T	TRINITY LAW SITTINGS BEGIN.	3 51	8 5
2	W	General Sir Redvers Buller, V.C., died, 1908.	3 50	8 6
3	Th	*Corpus Christi.*	3 49	8 7
4	F		3 49	8 8
5	S	Earl Kitchener drowned, 1916.	3 48	8 9
6	**S**	**1st Sunday after Trinity**	3 47	8 10
7	M	Messines Ridge captured, 1917.	3 47	8 11
8	T		3 46	8 12
9	W	Charles Dickens died, 1870.	3 46	8 12
10	Th	André Marie Ampère born, 1775; died, 1836.	3 46	8 13
11	F	*St. Barnabas.*	3 45	8 14
12	S	Sir Oliver Lodge born, 1851. Cooke and Wheatstone's Needle Telegraph patented, 1837.	3 45	8 15
13	**S**	**2nd Sunday after Trinity**	3 45	8 15
14	M	Allied Economic Conference at Paris, 1916.	3 44	8 16
15	T	Trans-Atlantic flight by Alcock and Brown, 1919.	3 44	8 16
16	W	*Drummond Castle* lost, 1896.	3 44	8 17
17	Th	Sir W. Crookes born, 1832.	3 44	8 17
18	F	War with U.S.A., 1812. Waterloo, 1815.	3 44	8 18
19	S	Field-Marshal Earl Haig born, 1861.	3 44	8 18
20	**S**	**3rd Sunday after Trinity** Accession of Queen Victoria, 1837.	3 44	8 18
21	M	Germans sink their warships at Scapa Flow, 1919.	3 45	8 18
22	T	M. Poincaré announced to the Académie des Sciences Becquerel's discovery of a positive electron in a Crookes tube, 1908.	3 45	8 19
23	W	Formal institution of Royal Society of Edinburgh, 1783.	3 45	8 19
24	Th	Midsummer Day.	3 45	8 19
25	F	Navigation Acts repealed, 1849.	3 46	8 19
26	S	Lord Kelvin born, 1824; died December 17th, 1907.	3 46	8 19
27	**S**	**4th Sunday after Trinity**	3 47	8 19
28	M	Peace signed between Germany and the Allies, 1919.	3 47	8 19
29	T	*St. Peter.*	3 48	8 19
30	W	Tower Bridge opened, 1894.	3 48	8 18

JULY, 1920

PHASES OF THE MOON.

July			h. m.	July			h. m.
	☾	*Last Quarter*	17 5·6	22	☽	*First Quarter*	7 20·4
15	●	New Moon	8 25·0	30	○	Full Moon	11 19·3

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	Th		3 49	8 18
2	F	Union of Great Britain and Ireland, 1800.	3 49	8 18
3	S	Sadowa, 1866.	3 50	8 17
4	S	**5th Sunday after Trinity**	3 51	8 17
5	M		3 52	8 16
6	T	King George's marriage, 1893.	3 53	8 16
7	W	Daylight Air Raid on London, 1917.	3 53	8 15
8	Th	Joseph Chamberlain born, 1836; died July 2nd, 1914.	3 54	8 15
9	F	Conquest of German South-West Africa, 1915.	3 55	8 14
10	S		3 56	8 13
11	S	**6th Sunday after Trinity**	3 57	8 12
12	M	Electric Units Bill legalising electric standards passed Congress, U.S.A., 1894.	3 58	8 12
13	T	R.34 accomplished Atlantic Flight, 1919.	4 0	8 11
14	W	Bastille stormed, 1789. French Public Holiday.	4 1	8 10
15	Th	Battle of the Marne begun, 1918. Conquest of German South-West Africa, 1915.	4 2	8 9
16	F	Nicholas II. of Russia assassinated, 1918.	4 3	8 8
17	S		4 4	8 7
18	S	**7th Sunday after Trinity** Foch's counter-attack begun, 1918.	4 5	8 6
19	M		4 7	8 5
20	T	*St. Margaret.*	4 8	8 4
21	W	Robert Burns died, 1796.	4 9	8 2
22	Th	*St. Mary Magdalene.*	4 11	8 1
23	F	Austrian Ultimatum to Serbia, 1914.	4 12	8 0
24	S	Honorary G.C.V.O. conferred on Senatore Marconi, 1914.	4 13	7 58
25	S	**8th Sunday after Trinity**	4 15	7 57
26	M		4 16	7 56
27	T	Captain Fryatt shot, 1916.	4 18	7 54
28	W	Austria-Hungary declared war on Serbia, 1914.	4 19	7 53
29	Th		4 20	7 51
30	F		4 22	7 50
31	S	Passing of British Telegraph Act, 1868.	4 23	7 48

AUGUST, 1920

PHASES OF THE MOON.

Date	Phase	h.	m.	Date	Phase	h.	m.
Aug. 7	☾ *Last Quarter*	0	50·7	Aug. 20	☽ *First Quarter*	22	51·8
13	● New Moon	15	43·9	29	○ Full Moon	1	2·8

Day			SUN. Rises. h. m.	SUN. Sets. h. m.
1	S	**9th Sunday after Trinity**	4 25	7 47
2	M	Fall of Soissons, 1918.	4 26	7 45
3	T	Germany declared war on France, 1914. First use of thermo couple and telephone for the reception of wireless telegraphy, 1897.	4 28	7 43
4	W	Great Britain declared war on Germany, 1914. First International Wireless Conference met at Berlin, 1903. Suspension of Transatlantic Wireless Service, 1917.	4 29	7 42
5	Th	First British-American cable worked, 1858.	4 31	7 40
6	F	*Transfiguration.*	4 32	7 38
7	S	*Name of Jesus.*	4 34	7 36
8	S	**10th Sunday after Trinity**	4 35	7 34
9	M	Heligoland formally ceded to Germany, 1890.	4 37	7 33
10	T	France declared war on Austria-Hungary, 1914.	4 39	7 31
11	W		4 40	7 29
12	Th	Yap wireless station destroyed, 1914. Great Britain declared war on Austria-Hungary, 1914.	4 42	7 27
13	F	Liége forts destroyed, 1914.	4 43	7 25
14	S	*Old Lammas Day.*	4 45	7 23
15	S	**11th Sunday after Trinity** Panama Canal opened, 1914.	4 46	7 21
16	M	Robert Wilhelm Bunsen died, 1899; born March 31st, 1811. William Hyde Wollaston born, 1776; died December 22nd, 1828.	4 48	7 19
17	T		4 50	7 17
18	W		4 51	7 15
19	Th	White Star liner *Arabic* sunk by German submarine, 1915.	4 53	7 13
20	F	Italy declared war on Turkey, 1915.	4 54	7 11
21	S		4 56	7 9
22	S	**12th Sunday after Trinity** Fall of Namur, 1914.	4 58	7 7
23	M	Chas. Augustin de Coulomb born, 1736; died, 1806.	4 59	7 5
24	T	Kamina (Togoland) wireless station destroyed by Germans, 1914.	5 1	7 3
25	W	Louvain destroyed, 1914.	5 2	7 1
26	Th	Conquest of Togoland, 1914.	5 4	6 59
27	F	Roumania declared war on Austria-Hungary, 1916. Italy declared war on Germany, 1916.	5 6	6 56
28	S	Germany declared war on Roumania, 1916. Trial of first submarine telegraph, 1850.	5 7	6 54
29	S	**13th Sunday after Trinity**	5 9	6 52
30	M	Turkey declared war on Roumania, 1916.	5 10	6 50
31	T	Hermann von Helmholtz born, 1821; died September 8th, 1894.	5 12	6 48

SEPTEMBER, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Sept. 5	☾	*Last Quarter*	7 4·9	Sept. 19	☽	*First Quarter*	16 55·2
12	●	New Moon	0 51·7	27	○	Full Moon	13 56·6

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	W	*St. Giles.* Fall of Pêronne, 1918.	5 13	6 45
2	Th	Board of Trade (Great Britain) constituted, 1786.	5 15	6 43
3	F	Fall of Riga, 1917.	5 17	6 41
4	S	First Night Aeroplane Raid on London, 1917.	5 18	6 39
5	**S**	**14th Sunday after Trinity**	5 20	6 36
6	M	*Mayflower* sailed, 1620.	5 21	6 34
7	T	*St. Evurtius.*	5 23	6 32
8	W	Sir John Henniker Heaton, Bart., died, 1914; born 1848.	5 25	6 30
9	Th	Luigi Galvani born, 1737; died December 4th, 1798.	5 26	6 27
10	F		5 28	6 25
11	S	First Battle of the Aisne, 1914.	5 29	6 23
12	**S**	**15th Sunday after Trinity**	5 31	6 21
13	M	Quebec taken, 1759.	5 33	6 18
14	T	*Holy Cross.*	5 34	6 16
15	W	Liverpool and Manchester Railway opened, 1830.	5 36	6 14
16	Th	Mr. A. Bonar Law born, 1858.	5 37	6 11
17	F	London and Birmingham Railway opened, 1838.	5 39	6 9
18	S	Jean Barnard Leon Foucault born, 1819; died, March 11th, 1908.	5 41	6 7
19	**S**	**16th Sunday after Trinity**	5 42	6 4
20	M		5 44	6 2
21	T	*St. Matthew.*	5 45	6 0
22	W	Michael Faraday born, 1791; died August 25th, 1867.	5 47	5 58
23	Th	Autumnal Equinox.	5 49	5 55
24	F		5 50	5 53
25	S	Bulgarians proposed armistice, 1918.	5 52	5 51
26	**S**	**17th Sunday after Trinity**	5 53	5 48
27	M	Duala (Cameroon) wireless station captured, 1914.	5 55	5 46
28	T	British captured Kut-el-Amara, 1915.	5 57	5 44
29	W	*St. Michael and All Angels.*	5 58	5 41
30	Th	Surrender of Bulgaria, 1918.	6 0	5 39

OCTOBER, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Oct. 4	☾	*Last Quarter*	12 53·6	Oct. 19	☽	*First Quarter*	12 29·3
„ 11	●	New Moon	12 50·4	„ 27	○	Full Moon	2 8·9

			SUN. Rises. h. m.	SUN. Sets. h. m.
1	F	Pheasant shooting begins.	6 2	5 37
2	S		6 3	5 35
3	S	**18th Sunday after Trinity**	6 5	5 32
4	M	German proposal for armistice, 1918.	6 7	5 30
5	T	Republic of Portugal proclaimed, 1910	6 8	5 28
6	W	Invasion of Serbia by Germans, 1915.	6 10	5 26
7	Th		6 11	5 23
8	F		6 13	5 21
9	S	Cambrai retaken, 1918. Germans occupied Antwerp, 1914.	6 15	5 19
10	S	**19th Sunday after Trinity**	6 17	5 17
11	M	*Volturno* burnt in mid-Atlantic, 1913. 521 persons saved.	6 18	5 15
12	T	MICHAELMAS LAW SITTINGS BEGIN.	6 20	5 12
13	W	Nurse Cavell shot by Germans, 1915.	6 22	5 10
14	Th	Great Britain declared war on Bulgaria, 1915.	6 23	5 8
15	F	The Gregorian Calendar introduced, 1582.	6 25	5 6
16	S	Houses of Parliament burnt, 1834.	6 27	5 4
17	S	**20th Sunday after Trinity**	6 28	5 2
18	M	*St. Luke.*	6 30	5 0
19	T	Sir Charles Wheatstone born, 1802; died, 1875.	6 32	4 57
20	W	First battle of Ypres began, 1914.	6 34	4 55
21	Th	Trafalgar Day. Death of Lord Nelson, 1805.	6 35	4 53
22	F	Edouard Branly born, 1844.	6 37	4 51
23	S		6 39	4 49
24	S	**21st Sunday after Trinity** French Victory at Verdun, 1916.	6 41	4 47
25	M	*St. Crispin.*	6 42	4 45
26	T	Aleppo taken, 1918.	6 44	4 43
27	W	Austria sued for peace, 1918.	6 46	4 41
28	Th	*St. Simon and St. Jude.*	6 48	4 39
29	F		6 49	4 37
30	S	Armistice with Turkey, 1918.	6 51	4 36
31	S	**22nd Sunday after Trinity** Beersheba taken, 1917.	6 53	4 34

NOVEMBER, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Nov. 2	☾	*Last Quarter*	19 35·0	Nov. 18	☽	*First Quarter*	8 12·8
10	●	New Moon	4 5·1	25	○	Full Moon	13 42·3

			SUN Rises h. m.	SUN Sets h. m.
1	M	*All Saints.* Naval Battle off Coronel, 1914.	6 55	4 32
2	T	*All Souls.*	6 56	4 30
3	W	Yarmouth bombarded, 1914.	6 58	4 28
4	Th		7 0	4 27
5	F	Great Britain declared war on Turkey, 1914.	7 2	4 25
6	S	Sir Wm. Preece died, 1913; born February 15th, 1834.	7 4	4 23
7	S	**23rd Sunday after Trinity**	7 5	4 21
8	M	John Milton died, 1674.	7 7	4 20
9	T	Armistice signed by German plenipotentiaries, 1918.	7 9	4 18
10	W	British at Mons, 1918.	7 11	4 17
11	Th	*Martinmas.*	7 12	4 15
12	F	International Conference for Safety of Life at Sea opened, 1913.	7 14	4 14
13	S	Prof. Clerk Maxwell born, 1831; died November 5th, 1879.	7 16	4 12
14	S	**24th Sunday after Trinity**	7 18	4 11
15	M	*St. Machutus.*	7 19	4 9
16	T	Inauguration of the Suez Canal, 1869.	7 21	4 8
17	W	*St. Hugh.*	7 23	4 7
18	Th	Sir Stanley Maude died, 1917.	7 25	4 5
19	F	Ferdinand de Lesseps born, 1805; died December 7th, 1894.	7 26	4 4
20	S	*St. Edmund.* Tolstoi died, 1910.	7 28	4 3
21	S	**25th Sunday after Trinity**	7 30	4 2
22	M	*St. Cecilia.*	7 31	4 1
23	T	*St. Clement.*	7 33	4 0
24	W	Faraday's discovery of magneto-electricity announced to Royal Society, 1831.	7 34	3 59
25	Th	Sir Isaac Newton born, 1642; died March 20th, 1727.	7 36	3 58
26	F		7 38	3 57
27	S	Wm. Cowper, poet, born, 1731; died April 25th, 1800.	7 39	3 56
28	S	**Advent Sunday**	7 41	3 55
29	M		7 42	3 54
30	T	*St. Andrew.*	7 44	3 54

DECEMBER, 1920

PHASES OF THE MOON.

			h. m.				h. m.
Dec. 2	☾	*Last Quarter*	4 29·0	Dec. 25	○	Full Moon	0 38·5
9	●	New Moon	22 3·9	31	☾	*Last Quarter*	16 34·7
18	☽	*First Quarter*	2 40·4				

			SUN Rises h. m.	SUN Sets h. m.
1	W		7 45	3 53
2	Th	Austerlitz, 1805. Fall of Monastir, 1915.	7 46	3 52
3	F	Thomas Carlyle born, 1795.	7 48	3 52
4	S	R. L. Stevenson died, 1894; born, November 13th, 1850.	7 49	3 51
5	S	**2nd Sunday in Advent** Admiral Jellicoe born, 1859.	7 50	3 51
6	M	*St. Nicholas.* Germans captured Bucarest, 1916.	7 52	3 50
7	T		7 53	3 50
8	W	Falkland Islands Battle, 1914.	7 54	3 50
9	Th	Jerusalem occupied by British, 1917.	7 55	3 49
10	F	Capt. Ross Smith completed aeroplane flight from London to Australia, 1919.	7 56	3 49
11	S		7 57	3 49
12	S	**3rd Sunday in Advent**	7 58	3 49
13	M	*St. Lucy.* Dr. Samuel Johnson died, 1784.	7 59	3 49
14	T	George Washington died, 1799; born February 22nd, 1732.	8 0	3 49
15	W		8 1	3 49
16	Th	Amundsen reached the South Pole, 1911.	8 2	3 49
17	F	Lord Kelvin died, 1907.	8 3	3 50
18	S	Sir J. J. Thomson born, 1856.	8 3	3 50
19	S	**4th Sunday in Advent**	8 4	3 50
20	M		8 5	3 51
21	T	*St. Thomas.* MICHAELMAS LAW SITTINGS END.	8 5	3 51
22	W	Winter Solstice.	8 6	3 51
23	Th		8 6	3 52
24	F	First German Air Raid on England, 1914.	8 7	3 53
25	S	**Christmas Day**	8 7	3 53
26	S	**1st Sunday after Christmas** *St. Stephen.*	8 7	3 54
27	M	*St. John. Boxing Day.*	8 8	3 55
28	T	*Holy Innocents.*	8 8	3 56
29	W	W. E. Gladstone born, 1809; died May 19th, 1898.	8 8	3 56
30	Th	Lord Macaulay died, 1859.	8 8	3 57
31	F	*St. Silvester.*	8 8	3 58

JEWISH CALENDAR
(A.D. 1920–A.M. 5680-5681)

The year 5680 of the Jewish Era began September 25th, 1919. The year 5681 begins on September 13th, 1920.

A.D. 1920		A.M. 5680	A.D. 1920		A.M. 5680
Jan. 1	Fast of Tebet ..	Tebet 10	Aug. 15	New Moon	Ellul 1
„ 21	New Moon	Sebat 1	Sept. 13	New Year, 5681 ..	Tishri 1
Feb. 20	New Moon	Ada 1	„ 14	Do. do. 2nd day	„ 2
Mar. 3	Fast of Esther ..	„ 13	„ 15	Fast of Gedaliah ..	„ 3
„ 4	Purim	„ 14	„ 22	Yom Kippur (Day of Atonement) ..	„ 10
„ 5	Shushan Purim ..	„ 15			
„ 20	New Moon	Nisan 1	„ 27	Feast of Tabernacles	„ 15
April 3	Festival of Passover ..	„ 15	„ 28	Do. 2nd day	„ 16
„ 4	Do. 2nd day	„ 16	Oct. 3	Hoshana Rabba ..	„ 21
„ 9	Do. 7th day	„ 21	„ 4	Feast of the Eighth Day	„ 22
„ 10	Do. ends	„ 22			
„ 19	New Moon	Iyar 1	„ 5	Rejoicing of the Law	„ 23
May 18	New Moon	Sivan 1	„ 13	New Moon	Marheshvan 1
„ 23	Pentecost	„ 6			
„ 24	Do. 2nd day ..	„ 7	Nov. 12	New Moon	Kislev 1
June 17	New Moon	Tammuz 1	Dec. 6	Hanuca, Dedication of the Temple ..	„ 25
July 4	Fast of Tammuz ..	„ 17			
„ 16	New Moon	Ab 1	„ 12	New Moon	Tebet 1
„ 25	Fast of Ab	„ 10	„ 21	Fast of Tebet ..	„ 10

NOTE.—All the Jewish Sabbaths and Festivals begin the previous evening at sunset.

MOHAMMEDAN CALENDAR
(Year 1338-1339)

The Year 1338 of the Mohammedan Era began on September 26th, 1919, and the Year 1339 will begin on September 15th, 1920 (September 14th, sunset).

Ramadan (Month of Abstinence) begins on May 19th, 1920.

Bairam (1st Shawall) begins June 18th, 1920.

Kurban-Bairam (the Festival of Sacrifice) begins August 16th, 1920.

Year.	Name of Month.	Month begins. A.D. 1920.	Year.	Name of Month.	Month begins. A.D. 1920.
1338.	Jomada I. ..	January 22	1338.	Dulkaada ..	July 17
„	Jomada II. ..	February 21	„	Dulheggia ..	August 16
„	Rajab ..	March 21	1339.	Muharram ..	September 15
„	Shaaban ..	April 20	„	Saphar ..	October 15
„	Ramadan ..	May 19	„	Rabia I. ..	November 13
„	Shawall ..	June 18	„	Rabia II. ..	December 13

GREEK AND RUSSIAN CALENDAR

The old style of dating which is used in Russia, Greece, and (according to latest information in Roumania, is ascertained by deducting 13 days from any English (new style) date—*i.e.*, March 30th (new style) corresponds to March 17th (old style), and so on for any date.

COPTIC CALENDAR
(Year 1636-1637)

The year 1636 of the Diocletian Era began on September 12th, 1919. The year 1637 begins on September 11th, 1920.

Year 1636.	A.D. 1920.	Year 1636.	A.D. 1920.
Tubah	Jan. 10	Masri	August 7
Amshir	Febr. 9	Intercalary	Sept. 6-10
Barmahat	Mar. 10	Year 1637.	
Barmudah	April 9	Tut	Sept. 11
Bashuns	May 9	Babah	Oct. 11
Bunah	June 8	Hatur	Nov. 10
Abib	July 8	Kihak	Dec. 10

In the Coptic Calendar, used by part of the population of Egypt, Nubia and Abyssinia, the year is composed of 12 months of 30 days each, followed by 6 or 5 Intercalary days according as the year is or is not a Leap-Year. The Era of this calendar is that of Diocletian, A.D. 284

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD

ALGERIA.
- *January 1.
- Easter Monday.
- Ascension Day.
- Whit Monday.
- *Fête Nationale, July 14.
- Assumption, August 15.
- All Saints' Day, November 1.
- *Christmas Day, December 25.

* If these days fall two days before or after Sunday the intervening day is a Customs holiday.

ARGENTINE REPUBLIC.
- January 1 and 6.
- March 2, 3 and 4 (Carnival), March 19.
- April 2, 3 and 4 (Holy Week).
- May 13 (Ascension Day), May 25.
- June 19 and 29.
- July 9.
- August 15 and 30.
- November 1 and 11.
- December 8 and 25.

AUSTRALIA.
- Christmas Day.
- Boxing Day.
- New Year's Day.
- Good Friday.
- Easter Saturday and Monday, and Banks and Offices Tuesday also. (Tuesday is not observed in New South Wales.)
- King's Birthday.
- Prince of Wales's Birthday.
- Eight Hour Day (different day in each State; day celebrating the granting of an eight hour working day in those States where the principle is legalised). New South Wales—First Monday in October. Queensland—1st May.
- Each of the States has also a holiday known as Anniversary Day, to celebrate its foundation. In each State there are holidays, annual and declared, with regard to local events and anniversaries.
- In New South Wales January 26 (Anniversary Day) and first Monday in August are also holidays.
- In Victoria there are also local holidays: Foundation Day (January 30); Eight-Hour Day (April 23); and in Melbourne and vicinity, Melbourne Cup Day (first Tuesday in November), and Picnic Day.
- In Western Australia, Anniversary Day (June 1) and the Monday following October 26 are also holidays; also one day in March (Lumpers' Picnic Day).
- In South Australia, at Port Adelaide, the following are observed as holidays as announced in Government Gazette: New Year's Day (January 1); Foundation Day (January 26); Good Friday (April 2); Easter Monday (April 5); King's Accession (May 10); King's Birthday (June 3); Prince of Wales's Birthday (June 28); Eight-Hour Day (October 13); Christmas Day (December 25); Proclamation Day (December 28); Anniversary of the State.

BELGIUM.
- New Year's Day.
- Shrove Monday and Tuesday.
- Easter Monday.
- Ascension.
- Whit Monday.
- July 21 (National Fête).
- August 4.
- August 15, Assumption.
- November 1, All Saints' Day.
- November 2, All Souls' Day.
- December 25, Christmas Day.
- December 26.
- In July at Ghent, and in August at Antwerp, there are also two days' local holidays (Kermesse), generally Monday and Tuesday.

BRAZIL.
- January 1, 6.
- February 24.
- April 21.
- May 1, 3 and 13.
- June 29.
- July 14.
- August 15.
- September 7.
- October 12.
- November 1, 2 and 15.
- December 8 and 25.
- Easter (Good Friday and Monday) and Carnival—(seven weeks previous) (Monday, Tuesday and Wednesday).
- Ascension Day.
- Corpus Christi.
- Various other holidays of a local nature are observed in the different States.
- January 20 and September 20 are Federal District holidays.

CANADA (DOMINION OF).
- New Year's Day. January 6 Epiphany.* Good Friday. Ascension Day.* All Saints' Day.* Conception Day.* Easter Monday. Christmas Day.
- Empire Day (May 24).
- July 1, Dominion Day.
- First Monday in September (Labour Day).
- King's Birthday, June 3, and any day proclaimed as a general Fast or Thanksgiving.

* These holidays are observed only in the Province of Quebec.

CHILE.
- January 1 and 6, Shrove Monday and Tuesday, Ash Wednesday, March 25, Easter (Thursday to Sunday), Ascension Day, June 29, August 15, September 8, 18, 19 and 20, November 1, December 8, 25.

CHINA (HONG KONG)
- New Year's Day.
- Chinese New Year.
- Good Friday.
- Saturday before Easter.
- Easter Monday.
- Whit Monday.

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD—*continued*

CHINA (Hong Kong)—*continued*
King's Birthday.
July 1.
First Monday in August, second Monday in October and November.
Empire Day.
Christmas Day.
December 26.

CHINA (SHANGHAI).*
New Year (January 1 and 2).
Chinese New Year (4 days, February 20-24)
Easter (3 days). (April 2, 3 and 5.)
Whitsuntide (1 day). (May 24.)
October 11 (Anniversary of Republic).
Christmas (December 25 and 27).
In addition, the Banks keep the following holidays:—Dragon Boat Festival (June 21), Midsummer (July 1 and 2), Autumn (First Monday in August), and Mid-Autumn Festival, Chinese (September 27).
The Customs usually observe New Year (3 days), Good Friday, Chinese New Year, Dragon Boat and Mid-Autumn Festivals, Anniversary (Oct. 11), Proclamation (Feb. 12) of Republic, Dec. 22 and Christmas Day.

COCHIN CHINA (FRENCH).
New Year's Day. Chinese New Year Festival. Easter Monday. Ascension Day. Whit Monday. July 14. Assumption (August 15). October 10. All Saints' Day (November 1). All Souls' Day (November 2), and Christmas Day.
If Jan. 1, July 14, Aug. 15 or Dec. 25 fall on Sunday the following day is a legal holiday.

COLOMBIA.
January 1 and 6. Holy Thursday. Good Friday. Ascension Day. St. Peter (June 29). July 20, Independence Day. August 7 and 15. October 12. All Saints' (November 1). December 8. Christmas Day.

COSTA RICA.
January 1.
Three days in Holy Week (Semana Santa).
May 1, Opening of Congress.
September 15, Independence Anniversary.
October 12, Columbus Day.
Christmas Day.
Also one or two others (religious festivals) when the Banks also close.

CUBA.
January 1.
February 24.
May 20.
October 10.
December 7.
December 25.
Good Friday is not a legal holiday, but is usually observed.

* The question of holidays is under consideration by the Chinese Authorities and the various Chambers of Commerce throughout the country with a view to arranging, if possible, a closer co-ordination.

DENMARK.
New Year's Day. Easter (Thursday, Good Friday and Monday). May 16 (Prayers Day). Ascension Day. Whit Monday. June 5 (Constitution Day) after noon. Christmas Day and December 26 in addition to all Sundays.

ECUADOR.
January 1, New Year's Day.
Good Friday.
August 10 } Independence Days of
October 9 } Quito and Guayaquil.
December 25, Christmas Day

EGYPT.
Government Holidays observed by the Customs are:—
Sultan's Birthday (March 26).
Sham-El-Nissim.
The King's Accession Day (May 6).
The King's Birthday (June 3).
Ramadan Bairam.
Qurban Bairam.
Holy Carpet (variable).
Mohammedan New Year's Day.
Sultan's Accession Day (October 9).
Birthday of the Prophet (December 5).
Sundays are also observed.

FINLAND.
Jan. 1, 6; March 25; Easter (Good Friday and Easter Monday); Ascension Day; June 24 (Midsummer Day); Christmas Day and December 26.

FRANCE.
New Year's Day. Easter. Ascension Day. Whitsuntide. French National Fête, July 14. Assumption, August 15. All Saints' Day. Christmas Day.

GERMANY.
New Year's Day.
Good Friday.
Easter Monday.
Ascension Day.
Whit Monday.
Third Wednesday in November (day of Fasting and Prayer).
December 25 and 26.

GREECE.
†*New Year's Day (January 14).
*Epiphany (January 19).
*Independence Day (April 7).
†Good Friday.
†Saturday before Easter.
†*Easter Monday.
†*St. George's Day (May 6).
Ascension.
†Holy Ghost.
St. Peter (July 12).
†Assumption (August 28).
†St. Demetrius's Day (November 8).
Christmas, January 6,† 7 † and 8.

Dates given are new style.

* Observed by Shipping Community.
† Observed by Customs.
The Shipping Community also observe S. Nicolas's Day and S. Spiridion's Day (Dec. 19 and 25). Customs observe also Christmas Eve, S. Constantine's Day (June 3), S. Nicolas (Dec. 19), S. Spiridion (Dec. 25).

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD—*continued*

GUATEMALA.
- •January 1.
- •March 15.
- Easter.
- •June 30.
- •September 15 (Independence Day).
- October 28.
- November 21.
- •December 25.

The recognised legal holidays are those marked •. Religious holidays are rarely observed in the ports.

GUIANA (British).
- January 1.
- June 3.
- English Bank Holidays.

HAITI.
- All Sundays, Jan. 1 and 2, May 1.
- Holy Thursday, Good Friday, Day of Opening the National Assembly, Mardi Gras, Day of Pentecost, Fête Dieu, Petite Dieu (half-day afternoon), August 15, November 1 and 2, December 25.

HOLLAND.
- New Year's Day, Easter Monday, Ascension Day, Whit Monday, Christmas Day and December 26.

HONDURAS (Republic).
- Holy Week and Independence Day (September 15).
- Christmas Day.
- New Year's Day.

HONDURAS (British).
- The Birthday of the Sovereign.
- The Birthday of the Heir to the Throne.
- Victoria Day, May 24.
- St. George's Caye Day, September 10.
- New Year's Day.
- Good Friday.
- Christmas Day, December 25.

INDIA.
- Public Holidays for the ensuing year are usually fixed in November by the Government and generally include: Christmastide (three days), New Year's Day, Easter (Friday to Monday), Emperor's Birthday, besides various Native Religious Festivals.

ITALY.
- New Year's Day. Easter Sunday. Christmas Day. Epiphany. Ascension Day. June 24 (St. John the Baptist) (at Genoa),• August 15, Assumption. September 20 (National Holiday). November 1, All Saints' Day.

• Not legally fixed, but customarily observed. At Civita Vecchia, April 28 (S. Fermina) is observed.

JAPAN.
- January 1 and 2. January 3 and 5. February 11. March 21 (changeable). Good Friday. Easter Monday. April 3. July 30. First Monday in August (Summer Holiday). August 31. September 24 (changeable). October 17. October 31. November 23. Christmas Day. December 26. December 31.

LIBERIA.
- New Year's Day (Jan. 1); Pioneer's Day (Jan. 7); Decoration Day (March 12) Good Friday (April 2); National Fast Day (April 11); Independence Day (July 26); National Flag Day (Aug. 24); Thanksgiving Day (November 6); Newport Day (Dec. 1); Christmas Day (Dec. 25); Church holidays are also official.

MADRAS.
- Vaikunta Ekadasi, January 2.
- Pongal, January 13 and 14.
- Mahasivaratri, February 18.
- Easter, April 3 and 5.
- Tamil New Year's Day, April 13.
- King-Emperor's Birthday.—One day in June to be notified.
- Ramzan, June 18.
- Bakr-id, August 25.
- Sri Jayanti, September 6.
- Vinayaka Chaturthi, September 16.
- Muharram (Last Day), September 23.
- Mahalaya Amavasya, October 11.
- Ayuda Puja, October 21.
- Dipavali, November 9.
- Bara Wafat, November 24.
- Vaikunta Ekadasi, December 21.
- Christmas, December 27, 28, 30 and 31.

MEXICO.
- New Year's Day. Epiphany (Jan. 6). Constitution Day (Feb. 5). Thursday before Easter. Good Friday. St. Joseph (March 19). May 5. Ascension Day. Corpus Christi. Assumption (Aug. 15). Sept. 16. All Saints' Day (Nov. 1). All Souls' Day (Nov. 2). Conception Day (Dec. 8). Dec. 12. Christmas Day.

MOROCCO.
- June 17 (Aid Seghir). Aug. 24 (Aid-el-Kebir). Sept. 23 (Ashora). Nov. 23 (Mouloud) 2 days.

NICARAGUA.
- Jan. 1, July 4 and 14, Holy Thursday, Good Friday, Sept. 14 and 15, Oct. 12 Dec. 25.
- Many religious holidays.
- The port of Corinto keeps the religious holidays, May 3 and Dec. 8.

NORWAY.
- New Year's Day. Easter Day and Easter Monday. May 17 (half-holiday). Ascension Day. Whit Sunday. Whit Monday. Pray Day, Nov. 5. Christmas Day and Dec. 26.

PANAMA (Republic of).
- Jan. 1, New Year's Day. Jan. 21, Foundation of the City of Panama. Feb. 15, Signing of the Act of Independence of Panama. Shrove Tuesday, "Martes del Carnaval." Holy Thursday. Good Friday. May 1, Labour Day. July 4 Independence of the United States. July 24, Birthday of Simon Bolivar. October 1, every fourth year—Inauguration of the New President (half-day). Oct. 12, Discovery of America. Nov. 3, Independence of Panama from Colombia. Nov. 28, Independence from Spain. Dec. 25, Christmas Day.

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD—*continued*

PANAMA (Republic of)—*continued*

Canal Zone—New Year's Day. Washington's Birthday (Feb. 22). Good Friday. Decoration Day (May 30). U.S. Independence Day (July 4). Labour Day, First Monday in September. Panama Independence Day (Nov. 3). Thanksgiving Day (last Thursday in Nov.). Christmas Day.

If a legal holiday fall on a Sunday, the Monday following will be observed as a legal holiday.

PARAGUAY.

Jan. 1, Feb. 3, May 14, 15. Aug. 15. Oct. 12. Nov. 25. Dec. 8 and 25.

PERSIA.

A number of Mohammedan Festivals are observed as holidays. These holidays commence at sunset of the previous day and no work is done till the succeeding noon.

PERU.

Jan. 1, 6. Shrove Monday and Tuesday. Ash Wednesday (half-day). March 19 (St. Joseph). Thursday and Friday before Easter. Ascension Day. Corpus Christi (movable). June 29. July 28, 29, 30. Aug. 15 and 30. Sept. 24. Nov. 1. Dec. 8 and 25.

In 1919, July 4 (American Independence Day) and July 14 (French National Fete) were declared public holidays, but it is uncertain whether these holidays will be observed in future years.

PORTO RICO.

New Year's Day. Feb. 22 (Washington's Birthday). March 22 (Abolition of Slavery). Good Friday. May 30 (Decoration Day). July 4 (Declaration of Independence). July 25 (Day of Landing of Americans). First Monday in September (Labour Day). Oct. 12 (Columbus Day). Last Thursday in November (Thanksgiving Day). Dec. 25 (Christmas Day).

PORTUGAL (Lisbon).

January 1 and 31.
May 3.
June 10.
October 5.
December 1 and 25.

Other holidays are also occasionally decreed by the Government.

RUMANIA.

Jan. 7, 8 and 9 (Christmas holidays). Jan. 14 (New Year's Day). Jan. 19 (Epiphany). Jan. 20 (St. John the Baptist). Feb. 6, National Holiday (Union of Principalities). Feb. 15 (Purification). March 27 (Proclamation of Rumania as a Kingdom). April 7 (Annunciation Day). Easter Monday and Tuesday (Greek). May 6 (St. George's Day). May 23 (King's Coronation). Ascension Day (Greek). June 3 (SS. Constantine and Helen). Whit Monday (Greek). July 12 (SS. Peter and Paul). Aug. 2 (St. Elias). Aug. 19 (Transfiguration). Aug. 28 (Assumption Day).

RUMANIA—*continued*

Sept. 11 (Death of St. John the Baptist). Sept. 21 (Nativity of B.V.M.), Sept. 27 (Exaltation of the Cross). Nov. 8 (St. Demetrius). Nov. 21 (SS. Michael and Gabriel). Dec. 4 (Presentation). Dec. 19 (St. Nicholas).

Dates given are New Style.

It is reported that since April 1, 1916, the Gregorian or new style Calendar is in use in Rumania.

RUSSIA.

Jan. 7 (Christmas Day). Jan. 8 (2nd Christmas Day). Jan. 9 (3rd Christmas Day). Jan. 14 (New Year's Day). Jan. 19 (Epiphany). Feb. 15 (Purification). Carnival Day. Carnival 2nd Day. April 7 (Annunciation of Blessed Virgin Mary). Palm Sunday. Thursday before Good Friday. Good Friday. Easter Saturday. Easter Monday. Easter Tuesday. Easter Wednesday. Easter 6th Day. May 22, St. Nicholas's Day. Ascension Day. June 8, Holy Ghost Day. Whit Monday. July 12, St. Peter and St. Paul. August 19, Transfiguration. August 28, Assumption Blessed Virgin Mary. September 11, Death of St. John the Baptist. September 12, St. Alexander Nevsky. September 21, Nativity of Blessed Virgin Mary. September 27, Exaltation of Cross. October 9, St. John the Evangelist. October 14, Intercession of Blessed Virgin Mary. November 4, Virgin of Kazan. December 4, Presentation of Blessed Virgin Mary.

Dates given are New Style.

SALVADOR.

January 1 and 6. March 1 and 15. Wednesday, Thursday, Friday and Saturday in Holy Week. Ascension Day. June 22 and 29. July 14. August 5 and 6. September 15 (Independence Day). October 12, November 1 (All Saints) and November 5. December 8, 24 and 25.

SANTO DOMINGO.

New Year's Day.
January 6.
Independence Day (February 27).
Corpus Christi.
August 16 (Spanish evacuation).
Las Mercedes (September 24).
Holy Week (Thursday and Friday).
Christmas Day.

SIAM.

King's Birthday (January 1).
New Year's Day (January 1).
Chinese New Year (February 21 and 22).
Siamese New Year (April 1).
Good Friday.
Accession Day (November 11).
Christmas Day.
Easter (Friday to Monday).
May 24, June 9, July 1, July 14, August 4, December 26.
Memorial Day of King Rama V. (October 23).
Other holidays are also observed, such as anniversary of King's Coronation, &c.

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD—*continued*

SOUTH AFRICA.

New Year's Day.
Good Friday.
Easter Monday.
Empire Day (May 24).
Union Day (May 31).
Ascension Day.
First Monday in August.
First Monday in October.
Dingaan's Day (December 16).
Christmas Day.
Boxing Day.

SPAIN.

January 1, Circumcision. January 6, Twelfth Night. March 19, St. Joseph. April 1, Holy Thursday. April 2, Good Friday. May 13, Ascension Day. June 3, Corpus Christi. June 29, SS. Peter and Paul. July 25, St. James. August 15, Assumption. November 1, All Saints' Day. December 8, The Immaculate Conception. December 25, Christmas Day.

STRAITS SETTLEMENTS.

New Year's Day.
Chinese New Year (two days, February 1 and 2).
Taipusum (January 17)
Easter (three days).
Whit Monday.
King's Birthday.
Hari Raya (June 30).
First Monday in August.
Government Holidays (November 13 and 15).
Christmas (two days).
These days are usually holidays, the following Monday being observed if any fall on Sunday.
At Singapore (February 6) and Penang (August 12) the Anniversaries of the Settlements are also observed as holidays. At Penang and Singapore the Hindoo Festival, Taipusum, is also a holiday.

SWEDEN.

January 1. January 6.
Annunciation (March 25).
Good Friday.
Day before Easter Holidays.
Easter Monday.
May 1.
Ascension Day.
Day before Whit Sunday.
Whit Monday.
June 23, 24.
December 24, 25, 26, 31.

TASMANIA.

January 1, New Year's Day.
January 26 (Foundation of Australia anniversary).
Eight-Hour Day.
Good Friday.
Easter Monday.
The King's Birthday (June 3).
Prince of Wales's Birthday (June 23).
Day of Wharf Labourers' Union Picnic.
Christmas Day, December 25.
December 26.
When Anniversary Day or King's Birthday falls on any day but Monday, the following Monday is observed instead, and whenever Christmas Day falls on Sunday the two days following are Bank Holidays. When any other holiday falls on Sunday the following Monday is a Bank Holiday.

TRIPOLI (BARBARY).

New Year's Day.
Epiphany (January 6).
Ascension Day (May 29).
August 15.
September 20.
All Saints' Day (November 1).
Christmas Day.

TURKEY.

January 1, New Year's Day, N.S.
January 7, Christmas Day, O.S.
January 14, New Year's Day, O.S.
January 19, Epiphany, O.S.
July 23, National Holiday.
August 15, Assumption, N.S.
August 28, Assumption, O.S.
November 1, All Saints' Day, N.S.
December 25, Christmas Day.
Bairam (one day).
Good Friday, N.S.
Easter Monday, N.S.
Holy Thursday, O.S.
Easter Monday, O.S.
Ascension, N.S. Ascension, O.S.
Pentecost, N.S. Pentecost, O.S.
Rosess (Jewish New Year's Day).
Pessah (Jewish Easter).
Kifour (Fête du Pardon).
Mevloud (Birthday of Mahomet).
Holy Gregory (Armenian Holiday)
Mahomet's Birthday.
Sheker-Bairam (3 days).
Courban-Bairam (4 days).
All holidays mentioned are Bank Holidays.

UNITED STATES OF AMERICA.

January 1. New Year's Day: In all States and District of Columbia, Porto Rico, Hawaii, and Alaska, except Massachusetts.
January 8. Anniversary of the Battle of New Orleans: In Louisiana.
January 19. Lee's Birthday: In Alabama, Arkansas, Florida, Georgia, North Carolina, South Carolina, and Virginia.
February 12. Georgia Day: In Georgia.
February 12. Lincoln's Birthday: In California, Colorado, Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Montana, Nebraska, Nevada, New Jersey, New York, North Dakota, Oregon, Pennsylvania, South Dakota, Washington, West Virginia, and Wyoming.
February 14. Admission Day: In Arizona.
February 17. Mardi Gras, Shrove Tuesday: In Alabama and Florida (in counties having a carnival); in Louisiana, in the parishes of Orleans, St. Bernard, Jefferson, St. Charles, and St. John the Baptist.
February 22. Washington's Birthday: In all the States, District of Columbia, Porto Rico, Hawaii, and Alaska.
March 2. Anniversary of Texan Independence: In Texas.

LIST OF OFFICIAL HOLIDAYS IN VARIOUS COUNTRIES OF THE WORLD—*continued*

UNITED STATES OF AMERICA—*continued*

March 4. Inauguration Day: In district of Columbia in years when a President of the United States is inaugurated.

March 22. Emancipation Day: In Porto Rico.

March 25. Maryland Day: In Maryland.

April 2. Good Friday: In Alabama, Connecticut, Delaware, Florida, Louisiana, Maryland, Minnesota, New Jersey, Pennsylvania, Porto Rico, Tennessee.

April 12. Halifax Independence Resolutions: In North Carolina.

April 13. Thomas Jefferson's Birthday: In Alabama.

April 19. Patriots' Day: In Maine and Massachusetts.

April 21. Anniversary of the Battle of San Jacinto: In Texas.

April 26. Confederate Memorial Day: In Alabama, Florida, Georgia, and Mississippi.

May 10. Confederate Memorial Day: In North Carolina and South Carolina.

May (Second Friday). Confederate Day: In Tennessee.

May 20. Anniversary of the Signing of the Mecklenburg Declaration of Independence: In North Carolina.

May 30. Decoration Day: In all the States and District of Columbia, Porto Rico, Hawaii, and Alaska, except Arkansas, Florida, Louisiana, Mississippi, North Carolina, South Carolina, and Texas. Confederate Memorial Day: In Virginia.

June 3 Jefferson Davis's Birthday: In Alabama, Florida, Georgia, Mississippi, South Carolina, and Texas. In Louisiana, known as "Confederate Memorial Day."

June 11. Kamehameha Day: In Hawaii.

June 15. Pioneer Day: In Idaho.

July 4. Independence Day: In all the States, and District of Columbia, Porto Rico, Hawaii, and Alaska.

July 24. Pioneers' Day: In Utah.

July 25. Landing of American Troops: Porto Rico.

August 1. Colorado Day: In Colorado.

August 16. Bennington Battle Day: In Vermont.

September 3. Labour Day: In all the States and District of Columbia, Porto Rico, Hawaii, and Alaska.

September (Third Saturday). Regatta Day: In Territory of Hawaii.

September 9. Admission Day: In California.

September 12. "Defenders' Day": In Maryland.

October (First Monday): Missouri Day (commemorative of Missouri history): In Missouri.

October (Second Friday) Farmers' Day: In Florida.

October 12. Columbus Day: In Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, Ohio, Oklahoma, Oregon. Pennsylvania, Porto Rico, Rhode Island, Texas, Vermont, Washington, West Virginia.

October 18. Alaska Day: In Alaska.

October 31. Admission Day: In Nevada.

November 1. All Saints' Day: In Louisiana.

November 6. General Election Day: In most of the States.

November (usually the last Thursday). Thanksgiving Day: Is observed in all the States and in the District of Columbia, Porto Rico, Hawaii, and Alaska, although it is not a statutory holiday in all.

December 25. Christmas Day: In all the States and the District of Columbia, Porto Rico, Hawaii, and Alaska.

Arbor Day: In some of the States. The date is not uniform.

Saturday Afternoon: In many of the States and cities and District of Columbia.

Sundays and Fast days are legal holidays in all the States which designate them as such.

There is no National holiday, not even the Fourth of July. Congress has at various times appointed special holidays. In the second session of the Fifty-third Congress it passed an Act making Labour Day a public holiday in the District of Columbia, and it has recognised the existence of certain days as holidays for commercial purposes, but, with the exception named, there is no general statute on the subject. The proclamation of the President designating a day of Thanksgiving only makes it a legal holiday in the District of Columbia and the Territories.

URUGUAY.

January 1 and 6. February 3 and 28. April 19. May 1, 18 and 25. June 29. July 4, 14 and 18. August 15 and 25. September 20. October 12. November 1. December 8 and 25. Also Monday and Tuesday preceding Ash Wednesday (Carnival), and Thursday, Friday and Saturday in Holy Week.

Holidays are liable to change by the Government at short notice.

VENEZUELA.

January 1.
Holy Thursday and Good Friday.
April 19.
July 5.
July 24.

BANK AND GENERAL HOLIDAYS

England.—Good Friday, Easter Monday, Whit Monday, First Monday in August, Christmas Day and December 26th, or (if that date is Sunday) December 27th.

Ireland.—Same as in England, with addition of St. Patrick's Day (March 17th), or Monday following if the 17th falls on Sunday.

Scotland.—New Year's Day, Good Friday, First Monday in May, First Monday in August and Christmas Day. If Christmas Day or New Year's Day falls on Sunday the Monday following is the Bank Holiday.

QUARTER DAYS

English.—Lady Day, March 25th; Midsummer, June 24th; Michaelmas, September 29th; Christmas, December 25th.

Scotch.—Candlemas, February 2nd; Whitsun, May 15th; Lammas, August 1st; Martinmas, November 11th. The removal term days are—May 28th and November 28th. If a Scotch term, or quarter day, falls on Sunday, the Monday following is term day.

ECLIPSES DURING 1920

I.—*A Total Eclipse of the Moon*, May 2nd, 1920, visible at Greenwich; the beginning visible generally in Europe, western Asia, Africa, the Indian Ocean except the eastern portion, the Atlantic Ocean, eastern North America, and South America; the ending visible generally in western Europe, western Africa, the Atlantic Ocean, North America except the extreme north-western portion, South America, and the eastern portion of the Pacific Ocean.

		d.	h.	m.	
Moon enters Penumbra	May	2	10	49·3	Greenwich Mean Time
Moon enters Umbra	„	2	12	0·8	
Total Eclipse begins	„	2	13	14·7	
Middle of the Eclipse	„	2	13	50·9	
Total Eclipse ends	„	2	14	27·1	
Moon leaves Umbra	„	2	15	41·3	
Moon leaves Penumbra ..	„	2	15	53·2	

Contacts of Umbra with Moon's Limb.	Angles of Position from the North Point.	The Moon being in the Zenith in Longitude from Greenwich.	and in Latitude.
First	83° to E.	+ 1° 56′	—15° 38′
Last	59 to W.	+55 18	—16 2

Magnitude of the Eclipse—1·224 (Moon's diameter=1·0).

II.—*A Partial Eclipse of the Sun*, May 17th, 1920, invisible at Greenwich.

	Greenwich Mean Time. d.	h.	m.	Longitude from Greenwich.	Latitude.
Eclipse begins .. May	17	16	16·9	—46° 28′	—46° 11
Greatest Eclipse „	17	18	14·7	—107 32	—46° 5
Eclipse ends .. „	17	20	12·6	—133 3	—32 7

Magnitude of Greatest Eclipse—0.973 (Sun's diameter=1·0).

At **Perth**, a Partial Eclipse is visible, Magnitude 0·55.

		d.	h.	m.	
Begins	May	17	17	51	Greenwich Mean Time
Greatest Phase	„	17	19	6	
Ends	„	17	20	2	

Angle from North Point of First Contact .. .. .. 237°
Angle from Vertex of First Contact .. .. 81°
Angle from North Point of Last Contact .. .. .. 115°
Angle from Vertex of Last Contact .. .. 343°

At **Adelaide**, a Partial Eclipse is partly visible, Magnitude 0·45,

		d.	h.	m.	
Begins	May	17	18	26	Greenwich Mean Time.
Greatest Phase	„	17	19	22	

Angle from North Point of First Contact .. .. .. 234°
Angle from Vertex of First Contact .. .. 99°

1919 CALENDAR 1919

JANUARY					
S	–	5	12	19	26
M	–	6	13	20	27
T	–	7	14	21	28
W	1	8	15	22	29
T	2	9	16	23	30
F	3	10	17	24	31
S	4	11	18	25	–

FEBRUARY					
S	–	2	9	16	23
M	–	3	10	17	24
T	–	4	11	18	25
W	–	5	12	19	26
T	–	6	13	20	27
F	–	7	14	21	28
S	1	8	15	22	–

MARCH						
S	–	2	9	16	23	30
M	–	3	10	17	24	31
T	–	4	11	18	25	–
W	–	5	12	19	26	–
T	–	6	13	20	27	–
F	–	7	14	21	28	–
S	1	8	15	22	29	–

APRIL					
S	–	6	13	20	27
M	–	7	14	21	28
T	1	8	15	22	29
W	2	9	16	23	30
T	3	10	17	24	–
F	4	11	18	25	–
S	5	12	19	26	–

MAY					
S	–	4	11	18	25
M	–	5	12	19	26
T	–	6	13	20	27
W	–	7	14	21	28
T	1	8	15	22	29
F	2	9	16	23	30
S	3	10	17	24	31

JUNE					
S	1	8	15	22	29
M	2	9	16	23	30
T	3	10	17	24	–
W	4	11	18	25	–
T	5	12	19	26	–
F	6	13	20	27	–
S	7	14	21	28	–

JULY					
S	–	6	13	20	27
M	–	7	14	21	28
T	1	8	15	22	29
W	2	9	16	23	30
T	3	10	17	24	31
F	4	11	18	25	–
S	5	12	19	26	–

AUGUST						
S	–	3	10	17	24	31
M	–	4	11	18	25	–
T	–	5	12	19	26	–
W	–	6	13	20	27	–
T	–	7	14	21	28	–
F	1	8	15	22	29	–
S	2	9	16	23	30	–

SEPTEMBER					
S	–	7	14	21	28
M	1	8	15	22	29
T	2	9	16	23	30
W	3	10	17	24	–
T	4	11	18	25	–
F	5	12	19	26	–
S	6	13	20	27	–

OCTOBER					
S	–	5	12	19	26
M	–	6	13	20	27
T	–	7	14	21	28
W	1	8	15	22	29
T	2	9	16	23	30
F	3	10	17	24	31
S	4	11	18	25	–

NOVEMBER						
S	–	2	9	16	23	30
M	–	3	10	17	24	–
T	–	4	11	18	25	–
W	–	5	12	19	26	–
T	–	6	13	20	27	–
F	–	7	14	21	28	–
S	1	8	15	22	29	–

DECEMBER					
S	–	7	14	21	28
M	1	8	15	22	29
T	2	9	16	23	30
W	3	10	17	24	31
T	4	11	18	25	–
F	5	12	19	26	–
S	6	13	20	27	–

1921 CALENDAR 1921

JANUARY						
S	–	2	9	16	23	30
M	–	3	10	17	24	31
T	–	4	11	18	25	–
W	–	5	12	19	26	–
T	–	6	13	20	27	–
F	–	7	14	21	28	–
S	1	8	15	22	29	–

FEBRUARY					
S	–	6	13	20	27
M	–	7	14	21	28
T	1	8	15	22	–
W	2	9	16	23	–
T	3	10	17	24	–
F	4	11	18	25	–
S	5	12	19	26	–

MARCH					
S	–	6	13	20	27
M	–	7	14	21	28
T	1	8	15	22	29
W	2	9	16	23	30
T	3	10	17	24	31
F	4	11	18	25	–
S	5	12	19	26	–

APRIL					
S	–	3	10	17	24
M	–	4	11	18	25
T	–	5	12	19	26
W	–	6	13	20	27
T	–	7	14	21	28
F	1	8	15	22	29
S	2	9	16	23	30

MAY					
S	1	8	15	22	29
M	2	9	16	23	30
T	3	10	17	24	31
W	4	11	18	25	–
T	5	12	19	26	–
F	6	13	20	27	–
S	7	14	21	28	–

JUNE					
S	–	5	12	19	26
M	–	6	13	20	27
T	–	7	14	21	28
W	1	8	15	22	29
T	2	9	16	23	30
F	3	10	17	24	–
S	4	11	18	25	–

JULY						
S	–	3	10	17	24	31
M	–	4	11	18	25	–
T	–	5	12	19	26	–
W	–	6	13	20	27	–
T	–	7	14	21	28	–
F	1	8	15	22	29	–
S	2	9	16	23	30	–

AUGUST					
S	–	7	14	21	28
M	1	8	15	22	29
T	2	9	16	23	30
W	3	10	17	24	31
T	4	11	18	25	–
F	5	12	19	26	–
S	6	13	20	27	–

SEPTEMBER					
S	–	4	11	18	25
M	–	5	12	19	26
T	–	6	13	20	27
W	–	7	14	21	28
T	1	8	15	22	29
F	2	9	16	23	30
S	3	10	17	24	–

OCTOBER						
S	–	2	9	16	23	30
M	–	3	10	17	24	31
T	–	4	11	18	25	–
W	–	5	12	19	26	–
T	–	6	13	20	27	–
F	–	7	14	21	28	–
S	1	8	15	22	29	–

NOVEMBER					
S	–	6	13	20	27
M	–	7	14	21	28
T	1	8	15	22	29
W	2	9	16	23	30
T	3	10	17	24	–
F	4	11	18	25	–
S	5	12	19	26	–

DECEMBER					
S	–	4	11	18	25
M	–	5	12	19	26
T	–	6	13	20	27
W	–	7	14	21	28
T	1	8	15	22	29
F	2	9	16	23	30
S	3	10	17	24	31

RECORD OF WIRELESS DEVELOPMENT

Years 1827—1919 inclusive.

RECORD OF THE DEVELOPMENT OF WIRELESS TELEGRAPHY AND TELEPHONY, AND INTERESTING ITEMS IN CONNECTION THEREWITH

The record below is intended to constitute a résumé, arranged in chronological order, of the outstanding events in wireless telegraphy from year to year.

This is a feature which has figured in our YEAR BOOK *from its initiation in* 1913. *The record for the past year will be found in an extended form at the end of this section.*

1827.

SAVARY found that a steel needle could be magnetised by the discharge from a leyden-jar.

1831.

Michael Faraday discovered electro-magnetic induction between two entirely separate circuits.

1837.

The first patent for an electric telegraph was taken out by Cooke and Wheatstone (London) and by Morse (U.S.A.).

1838.

K. A. Steinheil (Munich) discovered the use of the earth return, and suggested that the remaining metallic portion of the circuit might be dispensed with entirely, and a system of wireless telegraphy established.

1840.

Joseph Henry (U.S.A.) first produced high-frequency electric oscillations, and pointed out that the discharge of a condenser is oscillatory.

1842.

S. F. B. Morse made wireless experiments by electric conduction through water across Washington Canal and across wide rivers.

Joseph Henry noticed that the effect of a single electric spark about one inch long occurring in a circuit in an upper room was to magnetise steel needles included in another circuit placed in a cellar thirty feet below with two floors intervening. He was one of many observers prior to Hertz who had noticed curious effects due to electric sparks produced at a distance, which were commonly ascribed to ordinary electro-magnetic induction.

1843.

James Bowman Lindsay, of Dundee, suggested that if it were possible to provide stations not more than twenty miles apart all the way across the Atlantic, there would be no need to lay any cable.

1845.

Lindsay began making experiments across the River Tay, his method being to transmit messages by means of electricity or magnetism through and across the water without submerged wires, the water being utilised as the conducting medium.

1849.

Dr. O'Shaughnessy (afterwards Sir William O'Shaughnessy Brooke) succeeded in passing intelligible signals without any metallic conduction across the River Hooghly, 4,200 ft. wide, in India, but he found the cost of power prohibitive.

1859.

Bowman Lindsay gave a demonstration of his conduction system to the British Association Meeting, at which Michael Faraday and Sir William Thomson (afterwards Lord Kelvin) were both present. William H. Preece (afterwards Sir William) was deputed by the Electric Telegraph Company to report on Lindsay's system.

1862.

John Heyworth patented a method of conveying electric signals without the intervention of any continuous artificial conductor. Cromwell Varley tried this method, but found it a failure.

1867.

James Clerk Maxwell read a paper before the Royal Society, in which he laid down the theory of electro-magnetism, which he developed more fully in 1873, in his great treatise on electricity and magnetism. He predicted the existence of the electric waves that are now used in wireless telegraphy.

1870.

Von Bezold discovered that oscillations set up by a condenser discharge in a conductor give rise to interference phenomena.

1872.

Henry Highton made various experiments across the River Thames with Morse's method.

1879.

David E. Hughes discovered the phenomena on which depends the action of what was subsequently known as the coherer. These phenomena many years later were used in early electric-wave signalling. He found that a tube of metallic filings was sensitive to electric sparks made in its vicinity, and he was able to obtain such effects on a tube connected to a battery and a telephone at a distance of five hundred yards.

1880.

John Trowbridge, of Harvard, systematically studied the problem of propagation of electric current through "earth," either soil or water, and he found that signalling might be carried on over considerable distances by electric conduction through the earth or water between places not metallically connected.

1882.

Graham Bell experimented with Trowbridge's method on the Potomac River, when signals were detected at a distance of 1½ miles.

Sir William H. Preece made an experiment, using Morse's method, to connect the Isle of Wight with the mainland across the Solent on two occasions during the failure of the submarine cable in the Solent.

1883.

Willoughby Smith, in a paper before the Institution of Civil Engineers, London, suggested that electric induction might be employed for railway signalling.

Heinrich Rudolph Hertz became *privat docent* at Kiel, where he began studies in Maxwell's electro-magnetic theory.

G. F. Fitzgerald suggested a method of producing electro-magnetic waves in space by the discharge of a condenser.

1885.

Thomas A. Edison, with the assistance of Messrs. Gilliland, Phelps, and W. Smith, worked out a system of communication between railway stations and moving trains by means of induction and without the use of conducting wires.

Sir W. H. Preece made experiments at Newcastle-on-Tyne which showed that in two completely insulated circuits of square form, each side being 440 yards, placed a quarter of a mile apart, telephonic speech was conveyed from one to the other by induction.

1886.

A. E. Dolbear, of Tuft's College, Boston, patented a plan for establishing wireless communication by means of two insulated elevated plates, but there is no evidence that the method proposed by him did, or could, effect the transmission of signals between stations separated by any distance.

1887.

Heinrich Rudolph Hertz discovered the progressive propagation of electro-magnetic action through space, and was able to measure the length and velocity of electro-magnetic waves, and to show that in the transverse nature of their vibration, and their susceptibility to refraction and polarisation, they are in complete accordance with the waves of light and heat.

Hertz employed as a detector of the electric wave a simple nearly-closed circuit of wire, called the "Hertz Resonator," but it was subsequently discovered that the metallic microphone of Hughes was a far more sensitive detector.

A. W. Heaviside established communication by telephonic speech between the surface of the earth and the subterranean galleries of the Broomhill Collieries, 350 ft. deep, by laying above and below ground two complete metallic circuits, each about 2½ miles in length, and parallel to each other.

1889.

Elihu Thompson suggested that electric waves were particularly suitable for the transmission of signals through fogs and material objects.

1891.

John Trowbridge suggested that by means of magnetic induction between two separate and completely insulated circuits communication could be effected between distances.

1892.

Edouard Branly devised an appliance for detecting electro-magnetic waves, which was known as a "coherer." He discovered that these waves had the power of affecting the electric conductivity of materials when in the state of a powder.

Sir W. H. Preece adopted a method which united both conduction and induction as the means of affecting one circuit by the current in another. In this way he established communication between two points on the Bristol Channel, and at Lochness, in Scotland.

C. A. Stevenson, of the Northern Lighthouse Board, Edinburgh, advocated the use of an inductive system for communication between the mainland and isolated lighthouses.

1894

E. Rathenau, of Berlin, experimented with a conductive system of wireless telegraphy, and signalled through three miles of water.

1895.

Senatore G. Marconi's investigations led him to the conclusion that electrical actions and manifestations could be transmitted through the earth, air, or water by means of electrical oscillations of high frequency; and in consequence he made important experiments at his father's home in Italy.

Willoughby Smith established communication by conduction with the lighthouse on the Fastnet.

1896.

On February 2nd, Senatore Marconi came to England, and on June 2nd lodged his application for the first British Patent for Wireless Telegraphy, No. 12,039 of 1896.

In July of that year he was introduced to Sir William H. Preece, the Chief Electrical Engineer of the Post Office, at whose request Senatore Marconi conducted experiments over a distance of about 100 yards before the officials of the Post Office. Shortly afterwards a further series of trials was conducted by Senatore Marconi on Salisbury Plain, when communication was successfully established over a distance of 1¾ miles.

On July 27th the first demonstration of directional wireless, using reflectors, was given on the roof of the G.P.O., London.

On September 3rd experiments were conducted to determine the relative speed of propagation of light waves and the electric vibrations which actuated a receiver at a distance of 1¾ miles between reflectors.

On December 12th Sir William H. Preece lectured on Senatore Marconi's invention at Toynbee Hall, the inventor himself conducting the experiments.

1897.

In March, 1897, Senatore Marconi demonstrated before the representatives of various Government Departments, communication being established over a distance of 4 miles.

On March 17th balloons were first used for the suspension of wireless aerials.

In May further trials were made between Lavernock and Flatholm, a distance of over three miles; and on the 13th of that month the late Professor Slaby was present at further trials, when communication was established over a distance of about 8 miles.

In July, Senatore Marconi gave a demonstration of his invention at the Admiralty in Rome, and before King Humbert at the Royal Palace of the Quirinal. Between July 10th and 18th trials were made at Spezia, and on the 17th and 18th communication was maintained between the shore and the Italian cruiser *San Martin* at sea, at distances up to 10 miles.

On July 20th, 1897, the Wireless Telegraph and Signal Company, Limited, was incorporated, with a capital of £100,000, to acquire Senatore Marconi's patents in all countries except Italy and dependencies.

On August 27th Professor Slaby lectured on Wireless Telegraphy at the Sailors' Home, Potsdam, before the German Emperor and Empress and the King of Spain.

In September and October Senatore Marconi further experimented on Salisbury Plain. Trials were also made at Dover by officials of the Post Office. Apparatus was erected at Bath, and signals received from Salisbury, 34 miles away.

The first Marconi station was erected at the Needles, Isle of Wight, in November, and experiments conducted between that station and Bournemouth, a distance of 14½ miles.

On December 6th, in the presence of Captain Kennedy, R.E., tests were made between the Needles station and a steamer, readable signals being received up to a distance of 18 miles.

On December 7th the first floating wireless station was completed. It was operated by Senatore Marconi for developing the first two land stations on the Solent.

1898.

In May, 1898, Senatore Marconi experimented between St. Thomas's Hospital and the House of Commons. In the same month experiments were carried out between Ballycastle and Rathlin Island, a distance of 7½ miles.

On June 3rd Lord Kelvin visited the Needles station and sent from there the first paid marconigram.

On July 20th and 22nd the events of the Kingstown Regatta were reported by wireless telegraphy, for the Dublin *Daily Express*, from the steamer *Flying Huntress*, equipped with Marconi apparatus.

On August 3rd wireless telegraphic communication was established between the Royal yacht *Osborne* and Ladywood Cottage, Osborne, in order that Queen Victoria might communicate with the then Prince of Wales. Constant and uninterrupted communication was maintained during the sixteen days the system was in use.

On August 26th wireless messages were successfully transmitted through fog from Rathlin lighthouse.

In September the installation at Bournemouth was removed to Poole Harbour, Dorset.

By arrangement with Trinity House, wireless apparatus was installed in December, 1898, on the East Goodwin Lightship and at the South Foreland Lighthouse, the intervening distance being 12 miles.

1899.

During a gale in January, 1899, the East Goodwin Lightship was damaged and the mishap reported by wireless telegraphy to Trinity House.

On March 2nd Senatore Marconi read a paper on Wireless Telegraphy at the Institution of Electrical Engineers.

On March 3rd the s.s. *R. F. Matthews* ran into the East Goodwin Lightship. The accident was reported by wireless telegraphy to the South Foreland Lighthouse, and assistance was promptly sent.

On March 27th communication was established between Wimereux, near Boulogne, and the South Foreland Lighthouse.

On April 22nd the first French gun-boat was fitted with wireless telegraph apparatus at Boulogne.

The first wireless station at Chelmsford was finished on June 1st, and this was closely followed by the first wireless station at Dovercourt, which was finished and communicated with Chelmsford station on July 13th.

On July 14th Prof. Tuma established wireless communication between two balloons at Vienna.

During the naval manœuvres in July three British warships, equipped with Marconi apparatus, interchanged messages at distances up to 74 nautical miles (about 85 land miles).

During the meetings of the British Association at Dover and of the Association Française pour l'Avancement de Science at Boulogne, in August, communication was maintained by means of apparatus installed at the Dover Town Hall and at Wimereux.

The international yacht races which took place in September and October were reported by wireless telegraphy for the *New York Herald*. At the conclusion of the races, series of trials were made between the United States cruiser *New York* and the battleship *Massachusetts*, signals being exchanged between the vessels at distances up to about 36 miles. On the return journey from America Senatore Marconi fitted the s.s. *St. Paul* with his apparatus, and on November 15th established communication with the Needles Station when 36 miles away. Reports of the progress of the war in South Africa were telegraphed to the vessel, and published in a leaflet entitled *The Transatlantic Times*, printed on board.

In October the War Office adopted Marconi apparatus for use in the field in South Africa, and on November 2nd six electricians left for South Africa with sets of apparatus. These proved of considerable service to the Army and the Navy, to which latter they were subsequently transferred.

On November 22nd the Marconi Wireless Telegraph Company of America was formed for the purpose of exploiting Marconi patents in the United States of America and possessions.

1900.

On February 2nd Senatore Marconi delivered a discourse on "Wireless Telegraphy" at the Royal Institution.

On February 18th the first German commercial wireless station (Norddeutsche Lloyd Steamship Company) on Borkum Island was opened.

On February 28th the first German liner (*Kaiser Wilhelm der Grosse*) fitted with wireless apparatus communicated with Borkum Island over a range of 60 miles.

On April 25th the Marconi International Marine Communication Company was incorporated, with offices in London and Brussels, and agencies in Paris and Rome, for the maritime working of the Marconi system. On April 26th Senatore Marconi took out his important patent, No. 7,777, upon which all modern development is based, and which is commonly referred to as the "four sevens patent."

On July 4th a contract was made with the British Admiralty for the installation of apparatus on twenty-six of His Majesty's ships and six Admiralty coast stations.

In October the erection of the High Power Station at Poldhu was commenced, the engine-house being built in this year—viz., 1900.

The first wireless land station in Belgium was finished at Lapanne on November 2nd, 1900.

The *Princesse Clémentine* was fitted with wireless telegraphy on November 3rd, 1900, and communication established with Lapanne and maintained the whole way from Ostend to Dover.

1901.

On January 1st the barque *Medora* was reported by wireless as waterlogged on Ratel Bank. Assistance was immediately sent.

On January 19th the *Princesse Clémentine* ran ashore, and news of the accident was telegraphed to Ostend by wireless.

On January 22nd the wireless station at the Lizard was finished.

On February 11th communication was established between Niton Station, Isle of Wight, and the Lizard Station, a distance of 196 miles.

On February 14th the construction of transmitting and receiving plant and the aerial of the Poldhu Transatlantic station was commenced.

On March 1st a public Wireless Telegraph Service was inaugurated between the five principal islands of the Hawaiian group—viz., Oahu, Kauai Molaki, Maui and Hawaii.

In April communication was successfully established and maintained between a station at Calvi, Corsica, and another at Antibes, in the Riviera.

On May 15th, 1901, Senatore Marconi read a paper on Syntonic Wireless Telegraphy at the Royal Society of Arts, London.

The first British ship, the s.s. *Lake Champlain*, was equipped with wireless telegraphic apparatus on May 21st. About the same date coast stations in England and Ireland were opened for communication with ships at sea as follows:—Crookhaven, Co. Cork; Rosslare, Co. Wexford; Holyhead; Caister, near Yarmouth; North Foreland.

The masts at Poldhu were wrecked during a very heavy gale on September 20th, and the masts at Cape Cod shared a like fate in the November following. The masts were then replaced by four towers, 210 ft. high, built of timber.

On September 26th a 14 years' contract was made for the installation of wireless apparatus at ten of Lloyd's Signal Stations.

On October 15th the first fan aerials were erected for experiments between Poldhu and Newfoundland.

The Compagnie de Télégraphie sans Fil of Brussels was formed on October 26th, to develop and work the Marconi system on the Continent.

On December 12th and 13th signals were received by Senatore Marconi at St. John's, Newfoundland, from Poldhu station, Cornwall, a distance of 1,800 miles.

1902.

In February Senatore Marconi received on board the s.s. *Philadelphia* readable messages up to a distance of 1,551 statute miles, and signals up to a distance of 2,099 statute miles from Poldhu Station, Cornwall.

Senatore Marconi gave the first wireless demonstration in Scotland on May 6th at Dundee, and lectured on the "Progress of Electric Space Telegraphy" at the Royal Institution of Great Britain on June 13th.

On June 25th the first moving wire magnetic detector actuated by clockwork was installed on the Italian cruiser *Carlo Alberto*.

On July 14th-16th Senatore Marconi received messages from Poldhu on the Italian battleship *Carlo Alberto*, lying at Cape Skagen, a distance of 800 miles; and at Kronstadt, 1,600 miles.

The Colonial Premiers who were in England for King Edward's coronation witnessed a demonstration of Senatore Marconi's invention on board the *Koh-i-noor*.

On October 19th the cruiser *Carlo Alberto* left Plymouth for long distance experiments.

The Marconi Wireless Telegraph Company of Canada was formed on November 1st. On December 17th the first wireless message was transmitted across the Atlantic. On December 18th wireless messages were despatched by Senatore Marconi and the Earl Minto from the Cape Breton Station to His Majesty King Edward VII. Senatore Marconi also sent a message to King Victor of Italy. Senatore Marconi was made a member of the Italian Order of Merit.

1903.

President Roosevelt sent a Transatlantic message to King Edward VII. *viâ* Cape Cod and Poldhu Stations on January 18th. High-power and other stations were ordered by the Italian Government, and the Italian Senate and Chamber of Deputies tendered a vote of thanks to Senatore Marconi for the results obtained with wireless telegraphy.

The first Transatlantic marconigram was published in *The Times* on March 30th.

On April 5th the first licence for the erection of an Italian high-power station was granted.

The Compagnie Française Maritime et Coloniale de Télégraphie Sans Fil was formed on April 24th to exploit the Marconi system in France.

An agreement was made on July 24th by the British Admiralty for the general use of the Marconi system in the Navy.

The first International Conference on Wireless Telegraphy was held in Berlin on August 4th.

On August 22nd a wireless telegraphic service of news to ships at sea was inaugurated.

The passengers of the Red Star liner *Kroonland*, which was disabled on December 8th, 130 miles west of the Fastnet, were saved great inconvenience by wireless communication being established with the Crookhaven Station.

Senatore Marconi was made a Knight of the Order of St. Anne of Russia.

1904.

On January 12th the first wireless message was exchanged between the Army and Navy.

On January 20th the first Press message was transmitted across the Atlantic.

Meteorological information was supplied by wireless to the *Daily Telegraph*.

Accidents to s.s. *New York* and s.s. *Friesland* early in the year were reported by wireless telegraphy.

On August 15th the Wireless Telegraph Act of Great Britain was passed.

On August 22nd the Wireless News Message Service to liners was inaugurated.

On November 16th Dr. J. Ambrose Fleming took out his original patent, No 24,850, for thermionic valves.

1905.

On January 1st ships' messages were accepted at British Post Offices.

Judgment was given by Judge Townsend in New York on May 4th in favour of the Marconi Company in its action against the De Forest Wireless Telegraph Company for infringement of patents.

On May 12th the Canadian Government ordered stations for Cape Sable (N.S.) and St John (N.B.), and on May 30th instructions were given by Trinity House for five more lightships to be installed with wireless apparatus.

On September 4th the first demonstration was given of long distance wireless reception with an open oscillating circuit stretched along the ground.

Erection of the Clifden High-Power Station (Ireland) was commenced in October.

Senatore Marconi was made a Civil Member of the Royal Order of Savoy.

In 1905 Senatore Marconi took out his patent for the horizontal directional aerial (No. 14,788), which marked a step of great importance in the progress of long-distance work.

1906.

On March 23rd the first high-power directional aerial was used at Clifden.

In May a contract was entered into between the British Post Office and the Marconi Company whereby the latter was charged with the erection of wireless stations at Tobermory and Loch Boisdale, Scotland.

On August 4th the Argentine Marconi Company was formed to work Marconi patents in Argentina and Uruguay.

In October and November an International Radiotelegraphic Conference was held at Berlin, and a convention signed by most of the countries of the world.

On December 29th the first experiments with the Marconi high-speed disc discharger were carried out.

1907.

On February 8th successful tests were made of the use of steel discs for producing notes.

Marconi Transatlantic Stations at Clifden, Ireland, and Glace Bay (Nova Scotia) were opened for limited public service on October 17th.

1908.

On February 3rd transatlantic stations were opened to the general public for transmission of messages between the United Kingdom and the principal towns in Canada.

Senatore Marconi lectured on " The Commercial Application of Wireless Telegraphy " at Liverpool on February 24th.

The Russian Company of Wireless Telegraphs and Telephones was formed on October 8th.

1909.

The *Republic*, after collision with the s.s. *Florida* off the coast of the United States on January 23rd, succeeded in calling assistance by wireless, with the result that all her passengers and crew were saved before the vessel sank.

Senatore Marconi lectured before the Dutch Royal Institute of Engineers in May and in December.

The Marconi British coast stations were taken over by the Postmaster-General on September 29th, who was granted a licence to use the company's patents.

In December Senatore Marconi lectured at the Royal Academy of Science, Stockholm, and (with Prof. Braun) was awarded the Nobel Prize for Physics.

1910.

On February 7th the first Wireless Shipping Report was published at Lloyd's.

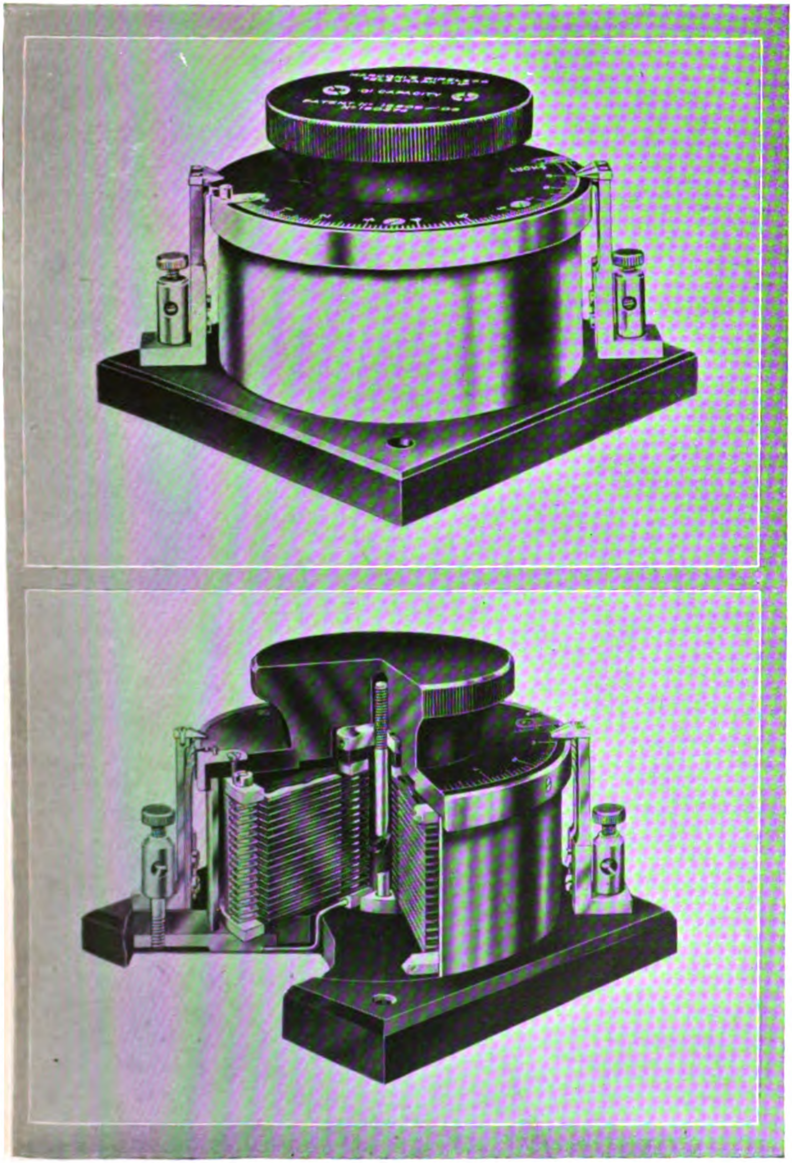
Senatore Marconi, *en route* for Buenos Aires on board the *Principessa Mafalda*, received messages from Clifden at a distance of 4,000 miles by day and 6,735 miles by night.

On April 23rd the Marconi Transatlantic (Europe-America) Service was opened.

The Compania Nacioñal de Telegrafia sin Hilos was formed on December 24th to exploit the Marconi system in Spain.

1911.

On February 21st judgment was given in the action instituted in December, 1910, by the Marconi Company against the British Radiotelegraph and Telephone Company for infringement of their tuning patent No. 7777 of 1900. Mr. Justice Parker's decision was in favour of the Marconi Company and he granted them a certificate of validity of their patent and an injunction together with costs and damages.



MARCONI RECEIVING DISC CONDENSER WITH EBONITE DI-ELECTRIC. THE LOWER PICTURE SHOWS THE APPARATUS IN SECTION.

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A contract was made between the Marconi Company and the Canadian Government for operating wireless telegraph stations in Canada for a period of 20 years.

Stations at Teneriffe, Cadiz, Barcelona, and Las Palmas were opened for public business by the Compania Naciońal de Telegrafia sin Hilos, the *concessionnaires* of the public wireless telegraph service of Spain.

The Imperial Conference held in May approved the proposal that an Imperial Wireless Telegraph system should be created.

Senatore Marconi lectured on "Radiotelegraphy" at the Royal Institution on June 2nd.

The Lodge-Muirhead patents were acquired by the Marconi Company, and Sir Oliver Lodge became a scientific adviser to the company.

1912.

Early in the year the American Marconi Company absorbed the United Wireless Company of the United States.

On January 27th the central station of the Spanish wireless service (Aranjuez) was opened by King Alfonso XIII.

In February the Marconi Company secured the patents of Bellini and Tosi, including those for the wireless direction-finder.

On February 9th the first Australian Commonwealth Station was opened.

On April 15th the s.s. *Titanic* struck an iceberg and sank, but, owing to the prompt wireless call for assistance, the lives of more than 700 of her passengers were saved.

Senatore Marconi, whilst in America, delivered an address on the "Progress of Wireless Telegraphy" before the New York Electrical Society, on April 17th.

The International Radiotelegraphic Conference, opened in London on June 4th, approved important regulations to secure uniformity of practice in wireless telegraphic services.

On July 5th the International Radiotelegraphic Convention was signed at London.

The British Government entered into a contract in July with the Marconi Company for the erection of a chain of high-power Wireless Telegraph stations, as recommended at the Imperial Conference held in 1911.

The Marconi Wireless Telegraph Company of Canada was entrusted by the Dominion Government on September 17th with the working of the existing stations on the Great Lakes until 1931, and also with the erection of further stations. A similar arrangement was made in December with the Newfoundland Government for stations at Belle Isle, and on the Labrador coast.

Senatore Marconi was decorated with the Grand Cross of the Order of Alfonso XII., and made a Grand Officer of the Order of St. Maurice and Lazarus.

1913.

During this year the Governments of France and the United States experimented between the Eiffel Tower station and Washington by wireless, to secure data for comparing the velocity of electro-magnetic waves with that of light.

In January the High Court of Justice of France delivered a judgment declaring the validity of all claims of the Marconi patent 305060, which corresponds with the "four sevens" patent.

On January 23rd the Postmaster-General appointed a committee "To consider and report on the merits of the existing systems of long-distance wireless telegraphy, and in particular as to their capacity for continuous communication for the distances required by the Imperial Chain." The Committee reported that "The Marconi system is at present the only system of which it can be said with any certainty that it is capable of fulfilling the requirements of the Imperial Chain."

As a result of the official enquiry into the loss of the *Titanic*, the *Scotia*, equipped with a Marconi wireless installation, left Dundee on March 8th to patrol the waters of the North Atlantic and to collect information regarding the movement of ice.

In June a Wireless Telegraph Bill was presented to the Ottawa Parliament, and passed under the title: "Radiotelegraph Act of Canada."

On October 11th the *Volturno* was burnt in mid-Atlantic, and in response to the wireless appeal ten vessels came to the rescue, 521 lives being saved.

The Wireless Society of London was formed in October.

On November 12th an International Conference for the purpose of considering means of saving life at sea was opened in London by the President of the Board of Trade.

On November 24th the first practical trials with wireless apparatus on trains were made on a train belonging to the Delaware, Lackawanna and Western Railroad of America.

On November 25th Commander H. A. Edwards, who was at the head of the Bolivian Survey Commission, reported that the Commission had been able to determine the difference of longitude between the Brazilian towns Mañaos and Porto Velho by means of wireless signals.

Dr. Mawson, whilst exploring in Antarctica, was enabled by means of wireless to keep in touch with the outer world through the station on Macquarie Island.

During his expedition to Central Asia Dr. Filippo de Filippi, the Italian explorer, frequently determined his longitude by means of wireless time signals transmitted from Lahore.

1914.

On January 20th the Safety of Life at Sea Convention, drawn up by the International Conference which met on November 14th, 1913, was signed at London. That section of the Convention which deals with Wireless Telegraphy lays down the minimum wireless telegraphy equipment to be carried by vessels of different grades.

Early in the year an International Wireless Conference met at Brussels. The object of the Conference was to adopt a programme whereby careful observations could be taken with a view to arriving at some practical explanation of the laws governing the variation in the strength of wireless signals.

During the early part of March Senatore Marconi joined one of the Italian war vessels attached to the squadron commanded by the Duke of Abruzzi. Experiments in wireless telephony were carried out between several vessels lying at anchor ⅝ mile apart, ordinary receivers being used with great success. The wireless telephone experiments were continued between two warships on the high seas, and the reception was consistently good over a distance of 18½ miles. Successful wireless telephone communications were effected later, using only very limited energy between vessels on the high seas 70 km. (44 miles) apart. These experiments were repeated where land intervened between the communicating vessels, and in this case again excellent results were obtained. On this day radiotelephonic communication was constantly maintained for twelve hours.

This year saw the first practical application of wireless to lifeboats belonging to large ocean steamships, the Marconi Company having designed a special type of apparatus for this purpose.

On April 12th the Council of the Royal Society of Arts presented the Society's Albert Medal to Senatore Marconi for his services in the development and practical application of wireless telegraphy.

On April 15th, at Godalming, a memorial was unveiled to the memory of Jack Phillips, chief wireless telegraphist of the ill-fated *Titanic*, who "died at his post when the vessel foundered in mid-Atlantic on the 15th day of April 1912."

On June 8th a report was issued by the Committee appointed by the Postmaster-General to consider how far and by what methods the State should make provision for research work in Wireless Telegraphy. This report recommends (1) that the Government should establish a National Committee for Telegraphic Research which would promote in the public interest, both by theoretical investigation and by experiment, the progress of telegraphy and telephony, and (2) that the Government should establish a National Research Laboratory, with a special scientific staff to undertake, under the direction of the Committee, and on the lines laid down in this report, telegraphic investigation, the results of which should be available for all departments of the public service.

In June important tests were made with the Marconi-Bellini-Tosi wireless direction finder on board the s.s. *Royal George*. During a voyage from Bristol to Montreal the liner, even in the thickest weather and without the aid of compass or sextant, was enabled to find her position when within a radius of about fifty miles of a land wireless station.

On July 24 the King conferred upon Senatore Marconi the Honorary Knighthood of the Grand Cross of the Victorian Order.

On July 24th judgment for plaintiffs was delivered in an action brought by the Marconi Company against the Helsby Wireless Telegraph Company Limited, for infringement of patent 7777 of 1900.

War was declared on Germany by Great Britain on August 4th and all *private* radiotelegraphy was suspended.

On August 9th the wireless station at Dar-es-Salaam, German East Africa, was announced to have been destroyed by the British.

The German station at Yap, Caroline Islands, was destroyed on August 12th.

On August 24th the Germans blew up the giant station at Kamina Togoland, to prevent its falling into the hands of the British.

On August 24th the United States Government notified the owners of the German Transatlantic station at Tuckerton, New Jersey, that its experimental licence had expired, and it must therefore close down. Arrangements were afterwards made for restricted working.

On August 29th the German wireless station at Samoa was captured by an Australian Naval Force.

The German station at Nauru, Marshall Islands, was captured shortly after this.

On September 12th an Australian Naval Reserve Force captured the German wireless station at Herbertshohe on the island of Neu Pommern.

The powerful German station at Duala, Cameroons, was seized on September 27th.

On November 9th a Japanese force occupied Kiauchau and its wireless station.

On November 13th the Marconi Wireless Telegraph Company of America obtained a preliminary injunction against the De Forest Radio Telephone

and Telegraph Company and the Standard Oil Company in a suit for infringement of patent.

On November 28th the following notice, under the Defence of the Realm (Consolidation) Regulations 1914 was issued : " No person shall, without the written permission of the Postmaster-General, buy, sell, or have in his possession or under his control any apparatus for the sending or receiving of messages by wireless telegraphy, or any apparatus intended to be used as a component part of such apparatus."

During the year high-power trans-oceanic stations were completed at Carnarvon (Wales), Belmar, New Jersey (U.S.A.), Honolulu (Hawaiian Islands), and San Francisco (Cal.). The Honolulu and San Francisco stations were formally opened to public service on September 24th.

1915.

In January Senatore Marconi took his seat in the Italian Senate.

On February 20th the Panama-Pacific Exhibition at San Francisco was officially opened by President Wilson at Washington, through the medium of wireless telegraphy.

A wireless telegraph service between Spain and Italy was inaugurated on May 1st.

On May 12th the German high-power wireless station at Windhoek was captured by a South African force.

On May 12th, in Battery Park, New York, the Mayor of New York unveiled the monument in memory of wireless operators who had lost their lives at the post of duty.

On July 8th, as a result of investigations into alleged breaches of neutrality, the United States Government decided to take over the control of the Telefunken wireless station at Sayville, Long Island.

At the annual meeting of Marconi's Wireless Telegraph Company on July 26th Mr. Godfrey Isaacs announced the complete destruction of the German wireless chain, upon which our enemy had expended so much money, and on which they based their high hopes of a commercial world-domination.

On July 27th wireless communication between the United States and Japan was effected. The two terminal stations were situated at San Francisco and Funabashi, near Tokio, and the messages were relayed through Honolulu.

On July 28th communication was obtained between Arlington and Hawaii by wireless telephony.

At the end of August the submarine cable between Oban and south-east Mull broke, and until its repair wireless telegraphy formed the only means of communication between the outlying islands and the mainland.

On September 28th the American Telephone and Telegraph Company, working in conjunction with the Western Electric Company, succeeded in telephoning by wireless across the American Continent from Arlington to Hawaii, a distance of nearly 5,000 miles.

In September a commercial wireless service was inaugurated between Japan and foreign countries viâ Ochüshi and Petropavlovsk, in Siberia.

On October 26th the wireless telephone experiments were continued, communication being effected across the Atlantic from Arlington to the Eiffel Tower, Paris.

In November Mr. Daniels, United States Secretary of the Navy, successfully transmitted from Washington a wireless telephonic naval order to Rear-Admiral Usher at Brooklyn Naval Yard.

On December 1st the wireless station at Macquarie Island was closed for the period of the war.

1916.

In January, by an Order in Council, His Britannic Majesty prohibited to all destinations the export of material for wireless telegraphs and telephones.

In February the Pope, restoring an ancient custom of the Church, announced his intention of officially blessing wireless telegraphy in recognition of its services to mankind.

During the course of a severe blizzard in the United States in February wireless telegraphy was extensively used for train despatching, as the telegraph wires had been destroyed.

In the early part of the year wireless enthusiasts in Holland formed a wireless association, "The Nederlandsche Vereeniging voor Radio-Telegraphie," with headquarters at The Hague.

During the Irish rebellion at Easter in this year wireless telegraphy played an important part, as the insurgents had entirely isolated Ireland by cutting the cable to England.

Among the subjects discussed at the Pan-American Conference held at Buenos Aires in April was the control of wireless telegraphy. This constituted a big step forward on the part of the South American Republics, clearly proving their appreciation of the necessity of a reliable wireless telegraphic service.

The determination of the difference in longitude between Paris and Washington with the aid of wireless telegraphy, which has been in progress since October, 1913, was completed in May, the result, expressed in terms of time, being 5 hours 17 minutes 35·67 seconds, and has a probable accuracy of the order of ·01 second.

On July 28th the *London Gazette* printed the text of a new official regulation requiring the owner of every vessel of 3,000 tons or over registered at a British port in the United Kingdom to take out a licence for a wireless installation before August 21st, 1916, irrespective of whether his ship carries passengers or not.

On September 20th, Judge Mayer, of the U.S.A. District Court, delivered an important decision regarding the suit tried before him, affecting the patents involved in the Fleming Valve controversy, between the Marconi's Wireless Telegraph Company of America and the De Forest Radio Telegraph and Telephone Company. He gave his decision in favour of the former, and his judgment has been pronounced to constitute one of the finest opinions on technical matters delivered from the American Bench.

On November 12th, Senatore Marconi delivered an important lecture at the Lincei Academy, Rome, before H.R.H. the Duke of Genoa, and a most distinguished audience. He took as his subject those problems of Radiotelegraphy to which scientists are likely to direct their attention in the immediate future.

The initiation of the newly established Trans-Pacific Wireless Service between the U.S. and Japan was celebrated on Wednesday, November 5th, by an interchange of messages between the Mikado and President Wilson.

1917.

On February 28th the wireless station of the *New York Herald*, re-equipped by the Marconi Wireless Telegraph Co., of America, again started operations.

On March 12th a new station was opened at Cape May (New Jersey), about a mile from the old installation and half a mile from the point of Cape May.

On March 12th a Women's Division of the National Amateur Wireless Association was formed in New York for war-time instruction, the first class of 25 convening at Hunter College, New York City.

At the beginning of August, the British Government found it advisable in national interests to suspend the Transatlantic Commercial Wireless Service, both eastbound and westbound.

On May 8th the Circuit Court of Appeals, New York City, confirmed the decision of Judge Mayer (reprinted in the YEAR-BOOK for 1917) that the De Forest Audion was an infringement of the Fleming Valve Patent and handed down an unanimous opinion in favour of the Marconi Wireless Telegraph Co. of America.

June 2nd marked the "coming of age" of wireless telegraphy—*i.e.*, that 21 years had elapsed since the registration of patent 12039 in 1896.

On June 6th Senatore Marconi, who was then on a visit to the United States on behalf of Italy, was invested by the world-famous University of Columbia with the honorary degree of Doctor of Science. Senatore Marconi's visit produced an immensely stimulating effect upon recruiting for wireless in the U.S.A.

On June 29th and 30th tests of Marconi's timed spark for continuous wave generation were carried out between the United Kingdom and the U.S.A.

In June, Commissioner Woods, of New York, pronounced the City's Police Wireless System a "demonstrated success" in a public statement officially issued by him.

In October, 1917, a radiophone fog warning device was installed by the United States Naval Communication Service near Newport, Rhode Island.

In the course of the year the Netherlands Government established two new radiotelegraphic stations on lightships at the Dogger Bank. Several new stations were opened by Norway, one Rundermand Station, near Bergen, and another Trywand Station, near Christiania.

Wireless communication was also opened up in the course of the year with Tulagi (Solomon Island) and with Ocean Island (Gilbert Group).

1918.

The trend of progress towards continuous wave communication as distinct from that by damped waves was very marked during this year, a particular impetus being given by the continued development of the thermionic valve as an efficient receiver and generator of undamped oscillations. Steady improvement was also evident in the arc form of generator which was installed in many new high-power stations.

Wireless telephony also progressed to a marked extent, particularly in the direction of reliability and increase of range, due mainly to the development of valve generator and receivers.

In the equipment of aircraft with wireless great progress was made, both in radiotelegraphy and radiotelephony.

With the signing of the Armistice the enormous part played in the war by the series of directional wireless stations utilising the Marconi modifications of the Bellini-Tosi Radiogoniometer was made public.

Several new high-power stations, forming part of the scheme of high-power wireless communication in the United States, were opened during the year. One of these, which is claimed to be capable of communicating over a distance of at least 4,000 miles, was erected at Annapolis, Md.

At the end of the year a high-power station, erected by the U.S. Government, was opened at Croix d'Hins, near Bordeaux.

In the Argentine the erection of a station destined for direct communication with the N. American continent was commenced in the vicinity of Buenos Ayres. It is owned by the Pan-American Wireless Telegraph and Telephone Company.

Considerable progress was also made with the erection of a Government wireless station at Karlsborg, Sweden, by the Telefunken Company.

The extension in the application of wireless telegraphy to merchant vessels continued, and at the close of the year some 2,500 to 3,000 vessels of the British Mercantile Marine carried installations.

On August 1st an Order in Council was published to the effect that every British sea-going ship of 1,600 gross tonnage or upwards registered in New Zealand, in respect of which a licence to instal wireless telegraph apparatus is or has been granted by the Minister of Telegraphs, shall be provided with a wireless telegraph installation, and with two certified operators.

On July 31st the U.S. Government took over all wireless land stations in the United States, with the exception of certain high-power stations, which remained under the control of commercial companies.

In August a powerful station was opened at Balboa, at the entrance to the Panama Canal. In connection with this station a wireless time signal service was inaugurated.

On September 22nd messages transmitted from Carnarvon were received in Sydney, 12,000 miles away. Cable confirmations of these messages were sent forward at the same time but were received some hours later than the corresponding radiotelegrams.

In March wireless communication was established between San Diego, California, and the American Legation in Pekin, a distance of roughly 7,500 miles.

In April a high-power station was opened at Stavanger, Norway, for the use of the Norwegian Government. This station, which will communicate directly with the United States, was erected by the Marconi Company.

On May 8th the New York Circuit of Appeals confirmed Judge Mayer's decision that the De Forest Audion was an infringement of the Fleming Valve patent.

On December 3rd the Marconi Transatlantic Service between Clifden and Glace Bay was reopened for public communication. Commercial working across the Pacific from San Francisco to Hawaii and Japan was resumed on December 19th.

1919.

The year 1919 has brought forth no revolutionary discoveries in the field of radiotelegraphy nor any very particularly marked developments, but has been characterised chiefly in the minds of many as a transition period from the fields of war-time activity to the realms of ordinary commercial work. As a direct result of this the most important radio papers, articles and discussions during the year have been devoted to accounts of different sections of wireless work, research, or experiment in one or other of the various government and other establishments and departments during the war. For example, at the Wireless Sectional meetings of the Institution of Electrical Engineers in London, lectures have been given by Lieut.-Col. A. G. T. Cusins on the "Development of Army Wireless during the War," by Major J. Erskine-Murray on the "Wireless Work of the Royal Air Force," by Capt. L. B. Turner on some of the apparatus developed by the Signals Experimental Establishment, by Professor C. L. Fortescue on some of the theoretical researches carried out at H.M. Signal School, Portsmouth. These papers have contained extremely useful facts and data and have helped in the gradual dissemination of some of the specialised knowledge accumulated in such establishments among those who have not been so directly connected

with such work. Much, however, yet remains to be told, and it is to be hoped that more information of like nature will speedily be released.

The annual meetings of the British Association were resumed this year, after temporary suspension in the latter part of the war, and a well-attended gathering was held at Bournemouth in September. Several papers of wireless interest were presented in Sections A (Physics) and B (Engineering). In particular, amongst these papers may be mentioned one by Professor C. L. Fortescue on "The Three-Electrode Valve as an Alternating Current Generator," which dealt mainly with work done during the war in the Wireless Telegraphy department of H.M. Signal School, Portsmouth, and with the development of valve transmitting sets for use in the Naval Service. These sets were arranged to be operated with the alternating current power plant already installed in the stations for the spark transmitters. High-voltage two-electrode valves were therefore employed to rectify the alternating potential difference to render it suitable for use with the three-electrode transmitting valves. Some very successful results were obtained with these transmitters. It may be noted in passing that the use of rectified high-voltage alternating current for supplying transmitting valves has also recently been receiving attention elsewhere. It has been employed by Mr. H. J. Round, of the Marconi Company, for wireless telephone transmitters, without any disturbing effects on the purity of the transmitted wave.

An important discussion was also held at the British Association meeting upon "Thermionic Valves," and a number of interesting facts were brought to light. A paper was read by Major T. Vincent Smith, dealing with the use made of wireless in the military wing of the Royal Flying Corps during the first three years of the war, up to the time of the incorporation of the corps into the Royal Air Force. The methods of radio direction finding developed by the Royal Air Force were also described by Capt. J. Robinson at the same meeting.

Papers have in addition been presented to the Institute of Radio Engineers (New York), setting out the results of research work, publication of which had been delayed owing to war restrictions. Mr. E. F. W. Alexanderson's paper describing the "Barrage" and "Bridge" receivers may be specially mentioned in this connection. Several articles of this nature have also been published in the *Electrical World*, in the *Revue Générale de l'Electricité*, and other periodicals.

The British Association Committee on Radiotelegraphic Investigations were fortunately able to avail themselves of the Solar Eclipse of May 29th for collecting further data relative to the mechanism of transmission of electromagnetic waves round the earth, and of the effect of sunlight upon such transmission. Some of the results, obtained with the co-operation of the Admiralty and with other wireless organisations, were communicated, as far as they were then available, to the British Association meeting in September. They indicated that there was no particularly noticeable change in either the intensity or the frequency of atmospherics, but that signals crossing the central line of the eclipse almost all showed a marked increase in strength. The most important deduction from the tests appeared to be that the changes in ionisation (or, whatever causes give rise to the signal strength variations) take place before the arrival of the densest umbral shadow. These ionisation and de-ionisation processes must, therefore, take place fairly rapidly, and it is particularly interesting to note that similar rapid changes in the ionised upper layers of the atmosphere with the position of the sun are also implied in the results of Dr. de Groot's researches in the Dutch East Indies.*

In connection with this problem of the transmission of electromagnetic waves round the earth, a marked advance in our knowledge of the subject

* An interesting account of these researches was given by Dr. J. Erskine-Murray, at a meeting of the Wireless Society of London, on December 19th, 1919.

was made during the year by the publication of a very important paper by Dr. G. N. Watson, presented to the Royal Society in June. This paper concludes the matter discussed in an earlier paper by the same author, presented to the Royal Society in 1918. The contents of the second paper were summarised by Dr. Watson at the British Association meeting in September, while Dr. B. van der Pol also published a paper in the *Philosophical Magazine* in September, analysing the results obtained by Dr. Watson. These papers appear to furnish fairly conclusive evidence that the electromagnetic waves used in wireless signalling cannot reach the distant receiving station purely through diffraction round the earth's surface, but that reflection at a fairly well defined upper layer must in all probability take place. His analysis leads to the striking result that the empirical formula deduced by L. W. Austin some years ago, largely from experiments made across the Atlantic, is given exactly by the theory if the ionised layer in the atmosphere has a well defined lower surface at a height of about 100 kilometres above the earth, and has a specific resistance of $6{\cdot}95 \times 10^5$ ohms per centimetre cube. It is a remarkable coincidence that in a paper read this year before the Institution of Electrical Engineers on "The Electrical Phenomena occurring at high levels in the Atmosphere," by Dr. S. Chapman, a diagram was shown summarising several hundred measurements made of the observed height of the aurora borealis, showing that the aurora ends sharply at a height of 100 kilometres, and that it is practically never observed below this level, although it stretches for some distance above. These observations, therefore, again indicate the presence of an ionised layer at this height.

While speaking of technical societies and their works, it should be mentioned that the Institute of Radio Engineers at its meeting on May 7th awarded a gold medal to Mr. E. F. W. Alexanderson for his valuable contributions to radio work; and also that an important step was taken by the Institution of Electrical Engineers in London, by the formation of a Wireless Sectional Committee, and of a Wireless Section at which technical papers of radio interest could be read and discussed. The year has also been marked by the foundation of a new journal devoted exclusively to recording the scientific development of radiotelegraphy and telephony. This journal, *The Radio Review*, is thus the first British periodical covering this branch of the subject.

The successful transatlantic flights of Alcock and Brown, of the American NC4, and of the British dirigible R34, during the summer of this year focused attention not only upon the great strides that have taken place in aviation, but also upon the application of wireless for such purposes, and its great value for aerial navigation. Unfortunately in the flight by Alcock and Brown only a low-power wireless set was fitted, and this was disarranged when commencing the flight, so that it served no practical purpose. The lack of wireless facilities was also keenly felt in the case of Hawker's first attempt at the Atlantic flight. In the American flight on the NC4 machine more attention was paid to the wireless, and although the set was normally estimated to have a range of only 300 miles in the air, and 150 miles on the water, it was stated after the flight that signals were heard from the machine over the remarkable range of 1,800 miles. Both in this case and in that of the R34, wireless telephone and direction finding installations were also fitted. In the latter instance more space was available for the purpose, and four sets were carried—a low-power spark set, a high-power C.W. set having a range of 1,500 miles, a wireless telephone having a range of 50 miles, and also direction finding gear. The chart of the flights of this vessel to New York and back, as compiled by the Air Ministry and showing the various radio communications carried out, forms a remarkable record of the success that has been achieved in this line of radio development.*

* This chart was published as a supplement to the *Wireless World* for September, 1919.

As regards ship wireless, during the war a special clause under the Defence of the Realm Act enforced, as is well known, the installation of wireless on all vessels over 1,600 tons. During the current year a Bill was introduced into Parliament by Lord Somerleyton with a view to bringing this regulation on to a permanent footing, and this Act is now in force. Early in the year the French Government issued a special order to the effect that all vessels of 500 tons and over which during the war had been fitted with wireless were to retain their installations for a period, until instructions were issued that they need no longer carry such apparatus unless desired. In February a Spanish decree was issued to the effect that all sailing vessels of 500 tons or more, carrying 50 or more passengers, are to carry a wireless installation.

As regards the commercial developments of wireless, there have been a few particularly noteworthy changes during the year. Amongst these must be mentioned the foundation of the Chinese National Wireless Co., for the manufacture of wireless equipment in China; of the Marconi Scientific Instrument Co., for the manufacture of instruments and apparatus under licence from the Marconi Co.; and of the Marconi-Osram Valve Co. The last-named company takes over the manufacture of valves previously handled by the Osram lamp works of the General Electric Co. In America an important amalgamation has taken place between the American Marconi Co. and the wireless interests of the American General Electric Co., with the formation of a new company known as the Radio Corporation of America. This amalgamation should yield a valuable unification in the control and development of wireless interests in the United States.

Lastly, the radio experimenter, handicapped in all private work during the war, is again gradually coming back to his own. In America, restrictions on receiving were removed in the spring, and on transmission on October 1st; while in this country a certain measure of freedom is again being granted, although full details as to experimental licences yet remain to be considered by Parliament. This valuable field for radio experiment, research and training is thus slowly becoming reorganised, and in conjunction with the re-opening of wireless clubs and societies should lead to considerable activity in this direction in the near future.

NATIONAL AND INTERNATIONAL WIRELESS LAWS & REGULATIONS

(A) Résumé of Radiotelegraphic Legislation.

(B) Text of International Radiotelegraphic Convention.

(C) Text of International Convention on Safety of Life at Sea.

(D) Wireless Laws and Regulations of the Countries of the World.

RÉSUMÉ OF RADIOTELEGRAPHIC LEGISLATION

THE signing of the International Convention for the Safety of Life at Sea on January 20th, 1914, constituted a most noteworthy advance in the legislation relating to Wireless Telegraphy. The Convention was drawn up by an International Conference which met in London on November 12th, 1913, and laid down, *inter alia*, the minimum Wireless Telegraphy equipment to be carried by ships of different grades. For the purpose of defining the hours of service (*i.e.*, setting out the times when the various stations are to open for the receipt and transmission of messages) the Radiotelegraphic Convention, 1912, divided ship stations into three classes, but did not specify which vessels (by virtue of the services maintained on board) should be placed in the various classes. Under the provisions of the Safety of Life at Sea Convention which deal with Wireless Telegraphy, these classes are clearly defined.

In order to give effect to this International Convention, the British Government has amended the laws relating to merchant ships by the Merchant Shipping (Convention) Act, 1914, and the Merchant Shipping (Wireless Telegraphy) Act, 1919. Part III. of the former deals with Wireless Telegraphy, and together with the 1919 Act, is reprinted under "*Great Britain*" in the "*Laws and Regulations*" section of this book.

Legislation relating to Wireless Telegraphy does not date back further than the year 1903, although four years earlier (in 1899) the Marconi system had reached a point of development sufficiently advanced for the British Admiralty to think it desirable to obtain sets of the apparatus for trial, and two years later (in 1901) an agreement of a limited nature was entered into between the Admiralty and the Company for the supply of Marconi apparatus. In July, 1903, a further and more complete agreement was concluded. At that time the increasing use of Wireless Telegraphy for maritime purposes throughout the world had raised questions of international interest, and circumstances had clearly demonstrated that international agreement was desirable with regard to many points dealing with the interchange of messages through the newly established medium.

A conference met at Berlin in August, 1903, on the invitation of the German Government. As a result of that conference all the Powers, with the exception of Great Britain and Italy, agreed to certain proposals, to be considered at a subsequent conference, for the international regulation of Wireless Telegraphy. The British delegates had been instructed to maintain an attitude of reserve owing to the position in which Wireless Telegraphy was placed in the United Kingdom, the fact being that in the state of the law at that time the Government had not sufficient control over Wireless Telegraphy to enable them to give effect to the provisions of the Convention.

The Wireless Telegraphy Act, which was passed in 1904 for two years only, and which was renewed in 1906 without modification (and is still in force), prohibits the installation or working of wireless telegraph apparatus in the United Kingdom, or on board British ships, except under licence from the Postmaster-General. Its principal objects were, by means of systematic regulations, to make Wireless Telegraphy more useful for purposes of defence and general communication. The memorandum which was laid before the House of Commons in explanation of the Bill stated that the necessity for legislation depended, firstly, on the importance from the naval point of view of giving the Government control over wireless stations in time of war or emergency; and, secondly, on the desirability of placing the Government in such a position as to have the power of entering into an agreement on the subject with other countries if it should be found expedient to do so.

In October, 1906, a second International Conference was held in Berlin, and its primary objects may be classified under the following headings:—(1) The acceptance and transmission of telegrams. (2) The adoption of rules of working. (3) The provision of means of collecting charges and settling accounts between the different countries. (4) Arrangements for the publication of all information necessary for inter-communication. (5) Rules to prevent interference and confusion in working, with adequate provisions for enforcement. (6) Provision that, with certain exceptions, inter-communication must not be refused on account of the differences in the systems of Wireless Telegraphy employed.

The documents signed at Berlin on November 3rd, 1906, consisted of:—(*a*) The Convention; (*b*) the Additional Undertaking; (*c*) the Final Protocol; (*d*) the Service Regulations. These documents were revised at the London Convention held in 1912, and the Radiotelegraphic Convention which came into operation on July 1st, 1913, is printed *in extenso* in the following pages. About 40 per cent. of the delegates present at the last conference were administrative, executive, or technical officials, acting for the postal telegraph and cable departments of the various countries represented. About another third of the assembly (37 per cent.) were composed of army and navy officers, the relative ratio of naval and military officers being about 4 to 3. About 6 per cent. of the delegates were trained and experienced diplomats, and the remainder included eminent scientists, noted meteorologists, and prominent personages interested in the technical, commercial, and humanitarian development of wireless telegraphy.

At the outbreak of the late war immediate steps were taken by the Governments of the belligerent countries to bring the use of Wireless Telegraphy under direct official control, and all stations not operated under Government supervision were ordered by the respective Governments to be dismantled.

This action, as might well have been expected, did not stop at the belligerent countries, but extended to neutral Governments almost all over the world. It was necessary that steps should be taken by non-belligerent powers to ensure that their neutrality obligations were not violated by the utilisation of wireless stations in their territory for the transmission of communications of a non-neutral character. Consequently, almost all countries throughout the world issued special regulations relating to the use of Wireless Telegraphy in war time. Many of these war-time measures have not, even yet, been repealed, and such as remain still in force will be found printed in the section of this book devoted to the Laws and Regulations of the World.

The central agency established for the purpose of collecting and distributing information in accordance with the requirements of the International Radiotelegraphic Convention is commonly known as the "Berne Bureau." This is merely a branch of the Bureau of the International Telegraph Union, situated at Berne, in Switzerland.

(*An article on the work of the Berne Bureau will be found in the "Special Articles" Section.*)

INTERNATIONAL RADIOTELEGRAPHIC CONVENTION

London, July 5th, 1912.

INTERNATIONAL Radiotelegraphic Convention concluded between Great Britain and various British Colonies and Protectorates*, Union of South Africa, Commonwealth of Australia, Canada, British India, New Zealand, Greece, Italy and Italian Colonies, Germany and Protectorates, United States of America and Possessions, Argentina, Austria, Hungary, Bosnia-Herzegovina, Belgium, Belgian Congo, Brazil, Bulgaria, Chili, Denmark, Egypt, France and Algeria, French West Africa, French Equatorial Africa, Indo-China, Madagascar, Tunis, Japan and Chosen, Formosa, Japanese Sakhalin and the leased territory of Kwantung, Morocco, Monaco, Nórway, Netherands, Dutch Indies, Curaçao, Persia, Portugal and Portuguese Colonies, Roumania, Russia and Russian Possessions and Protectorates, San Marino, Siam, Spain, Sweden, Turkey and Uruguay.

The undersigned Plenipotentiaries of the Governments of the countries enumerated above, being assembled in Conference in London, have, by mutual consent, and subject to ratification, concluded the following Convention :—

ARTICLE 1.

Application of Provisions.

The High Contracting Parties undertake to apply the provisions of the present Convention at all the radiotelegraph stations (coast stations and ship stations) which are established or worked by the Contracting Parties and open for the service of public correspondence between the land and ships at sea.

They undertake, moreover, to impose the observance of these provisions upon private enterprises authorised either to establish or to work radiotelegraphic coast stations open to the service of public correspondence between the land and ships at sea, or to establish or to work radiotelegraphic stations whether open for public correspondence or not on board the ships which carry their flag.

ARTICLE 2.

Interpretation of Terms.

The term coast station means radiotelegraphic station established on land or on board any ship permanently anchored and used for the exchange of correspondence with ships at sea.

The term ship station means any radiotelegraphic station established on board a ship other than a permanently moored ship.

ARTICLE 3.

Compulsory Interchange of Messages.

Coast stations and ship stations are bound to exchange radio-telegrams reciprocally without regard to the radiotelegraph system adopted by such stations.

Each ship station is bound to exchange radiotelegrams with any other ship station without distinction as to radiotelegraphic system adopted by such stations.

Nevertheless, in order not to impede scientific progress, the provisions of the present Article do not prevent the contingent employment of a radiotelegraphic system incapable of communicating with other systems, provided that such incapacity be due to the specific nature of such system and that it be not caused by devices adopted solely with the object of preventing inter-communication.

ARTICLE 4.

Restriction of Service.

Notwithstanding the provisions of Article 3, a station may be appropriated to a restricted public service determined by the object of the correspondence or by other circumstances independent of the system employed.

ARTICLE 5.

Connection with Land Telegraph System.

Each of the High Contracting Parties undertakes to cause the coast stations to be connected with the telegraph system by means of special wires, or, at least, to take such other measures as will ensure a rapid exchange between the coast stations and the telegraph system.

ARTICLE 6.

Notification of Particulars.

The High Contracting Parties shall mutually notify one another of the names of the coast stations and ship stations covered by Article 1,

* Barbados, Basutoland, Bermudas, Borneo, Ceylon, Cyprus, Gold Coast and Ashanti, Malay States (Perak, Selangor, Negri Sembilan, Pahang), Gambia, Gibraltar, British Guiana, British Honduras, Hong Kong, Bahama Islands, Windward Islands (Grenada, St. Lucia, St. Vincent), Falkland Islands, Fiji Islands, Leeward Islands (Antigua, Montserrat, St. Kitts-Nevis, Dominica, Virgin Islands), Jamaica, Turks and Caicos Islands, Cayman Islands, Malta, Mauritius, Northern and Southern Nigeria, Western Pacific Islands (Fanning Island, Gilbert and Ellice Islands, British Solomon Islands), West African Protectorate, Uganda, Bechuanaland, Nyassaland, British Somaliland, Northern and Southern Rhodesia, Seychelles, Sierra Leone, St. Helena, Straits Settlements (Labuan, Cocos Islands), Swaziland, Trinidad and Tobago, Wei-hai-wei.

as well as of all the particulars necessary to facilitate and accelerate the radiotelegraphic exchanges as specified in the Detailed Regulations.

ARTICLE 7.

Other Radiotelegraphic Arrangements.

Each of the High Contracting Parties reserves to itself the right to prescribe or to permit in the stations covered by Article 1—independently of the installation of which the particulars are published conformable to Article 6—the installation and working of other arrangements designed for special radiotelegraphic transmission without publication of the details of such devices.

ARTICLE 8.

Interference with Other Stations.

The working of radiotelegraphic stations shall be organised as far as possible in such a manner as not to interfere with the working of other stations of the kind.

ARTICLE 9.

Distress Calls.

Radiotelegraphic stations shall be obliged to accept with absolute priority calls of distress from whatever source, to reply in like manner to such calls, and to give the effect to them which they require.

ARTICLE 10.

Charges.

The charge for a radiotelegram shall include, according to the circumstances :—

1. (*a*) The "coast charge" which accrues to the coast station.

(*b*) The "ship charge" which accrues to the ship station.

2. The charge for transmission over the lines of the telegraph system, calculated in accordance with the ordinary rules.

3. The transit charges of the intermediate coast or ship stations and the charges appertaining to special services required by the sender.

The rate of the coast charge shall be subject to the approval of the Government to whose authority the coast station is subject, and the rate of the ship charge to the approval of the Government to which the ship belongs.

ARTICLE 11.

Validity and Modifications.

The provisions of the present Convention are completed by Detailed Regulations which have the same validity and come into force at the same time as the Convention.

The provisions of the present Convention and of the Regulations relating thereto may be modified at any time by mutual consent of the High Contracting Parties. Conferences of Plenipotentiaries having power to modify the Convention and the Regulations shall take place periodically; each Conference shall itself fix the place and time of the succeeding Conference.

ARTICLE 12.

Exercise of Voting Powers.

These Conferences shall be composed of Delegates of the Governments of the Contracting Parties.

In the deliberations each country shall have one vote only.

If a Government adhere to the Convention for its colonies, possessions or protectorates, subsequent Conferences may determine that the whole or part of such colonies, possessions or protectorates is to be regarded as forming a country for the purposes of the foregoing clauses. But the number of votes to be exercised by a Government, including its colonies, possessions or protectorates, may not exceed six.

The following are regarded as forming a single country for the purposes of the present Article :—

The Union of South Africa.
The Australian Commonwealth.
Canada.
British India.
New Zealand.
Ex-German East Africa.
Ex-German South-West Africa.
The Cameroons.
Togoland.
The Ex-German Pacific Protectorates.
Alaska.
Hawaii and the other American possessions in Polynesia.
The Philippine Islands.
Porto Rico and the American possessions in the Antilles.
The zone of the Panama Canal.
The Belgian Congo.
The Spanish Colony of the Gulf of Guinea.
French West Africa.
French Equatorial Africa.
Indo-China.
Madagascar.
Tunisia.
Erythrea.
Italian Somaliland.
Chosen, Formosa, Japanese Sakhalin and the leased territory of Kwantung.
The Dutch Indies.
The Colony of Curaçao.
Portuguese West Africa.
Portuguese East Africa and the Portuguese possessions in Asia.
Russian Central Asia (littoral of the Caspian Sea).
Bokhara.
Khiva.
Western Siberia (littoral of the Arctic Ocean).
Eastern Siberia (littoral of the Pacific Ocean).

ARTICLE 13.

Collection of Information.

The International Bureau of the Telegraph Union shall be entrusted with the duty of collecting, co-ordinating, and publishing information of every kind relating to radiotelegraphy; of circulating in proper form proposals for the modification of the Convention and of the Regulations; of notifying the changes adopted, and, generally, of carrying out any Administrative work which it may be called upon to undertake in the interests of International Radiotelegraphy.

The expenses of this institution shall be borne by all the Contracting Parties.

ARTICLE 14.

Conditions of Transmission and Receipt.

Each of the High Contracting Parties reserves to itself the right to fix the conditions under which it will admit radiotelegrams coming from or destined for a station, whether a ship station or a coast station, which is no subject to the provisions of the present Convention.

If a radiotelegram is admitted, the ordinary charges must be applied to it.

Every radiotelegram originating at a ship station and received by a coast station of the contracting country, or accepted in transit by the Administration of a contracting country, shall be sent forward.

Every radiotelegram intended for a ship shall also be sent forward if the Administration of the contracting country has accepted it from the sender, or if the Administration of a contracting country has accepted it in transit from a non-contracting country, subject to the right of the coast station to refuse transmission to a ship station belonging to a non-contracting country.

ARTICLE 15.

Further Applications.

The provisions of the Articles 8 and 9 of this Convention are equally applicable to radiotelegraphic installations other than those indicated in Article 1.

ARTICLE 16.

Admission of New Parties.

Governments which have not taken part in the present Convention shall be allowed to become party to it at their own request.

Such adherence shall be notified through diplomatic channels to that one of the contracting Governments in whose territory the last Conference was held, and by that Government to the others.

Such adherence shall involve complete acceptance of all the clauses of the present Convention and admission to all the advantages stipulated therein.

The adherence to the Convention of the Government of a country having colonies, possessions, or protectorates shall not carry with it the adherence of the colonies, possessions, or protectorates of such Government, unless a declaration be made to that effect by such Government. These colonies, possessions, or protectorates as a whole, or each one of them separately, may form the subject of a separate adherence or of a separate denunciation under the conditions indicated in the present Article and in Article 22.

ARTICLE 17.

Application of International Telegraph Convention of 1875.

The provisions of Articles 1, 2, 3, 5, 6, 7, 8, 11, 12, and 17, of the International Telegraph Convention of St. Petersburg dated 10/22 July, 1875, shall be applicable to International Radiotelegraphy.

ARTICLE 18.

Arbitration.

In cases of difference of opinion between two or more contracting Governments concerning the interpretation or the execution either of the present Convention or of the Regulations provided for by Article 11, the question at issue may, by mutual consent, be submitted to arbitration. In that event each of the Governments concerned shall choose another not interested in the question.

The decision of the Arbitrators shall be made by an absolute majority of votes.

In the event of an equality of votes, the Arbitrators shall appoint, in order to settle the difficulty, another Contracting Government not concerned in the question in dispute. In default of an agreement with regard to such choice, each Arbitrator shall propose a Contracting Government not interested in the dispute; and lots shall be drawn as between the Governments proposed. The drawing of lots shall be the prerogative of the Government in whose territory the International Bureau provided for in Article 13 performs its work.

ARTICLE 19.

Legislative Measures.

The High Contracting Parties undertake to adopt or to propose to their respective legislatures the measures necessary to ensure the execution of the present Convention.

ARTICLE 20.

Communication between Contracting Parties.

The High Contracting Powers shall communicate to one another such laws as may have been already enacted or which may be about to be so enacted in their countries, relating to the subject of the present Convention.

ARTICLE 21.

Freedom of Action.

The High Contracting Parties maintain their entire liberty concerning the radiotelegraphic installations not covered by Article 1, and particularly with regard to naval and military installations, and also to stations carrying out communications between fixed points. All such installations and stations shall remain subject solely to the obligations provided for in Articles 8 and 9 of the present Convention.

Nevertheless, when these installations and stations carry out an exchange of maritime public correspondence, they shall conform, in carrying out such service, to the requirements of the Regulations so far as concerns the method of transmission and accounting.

If, on the other hand, coast stations carry out, at the same time as public correspondence with ships at sea, communications between fixed points, they shall not be subject, in the execution of this latter service, to the provisions of the Convention, except as to the observance of Articles 8 and 9 of this Convention.

However, fixed stations which carry out correspondence between land and land must not refuse the exchange of radiotelegrams with another fixed station on account of the system adopted by such station; nevertheless, the liberty of each country shall remain complete in respect of the organisation of the service for correspondence between fixed points and the decision as to the correspondence to be carried out by the stations appropriated to such service.

ARTICLE 22.

Date of Operation.

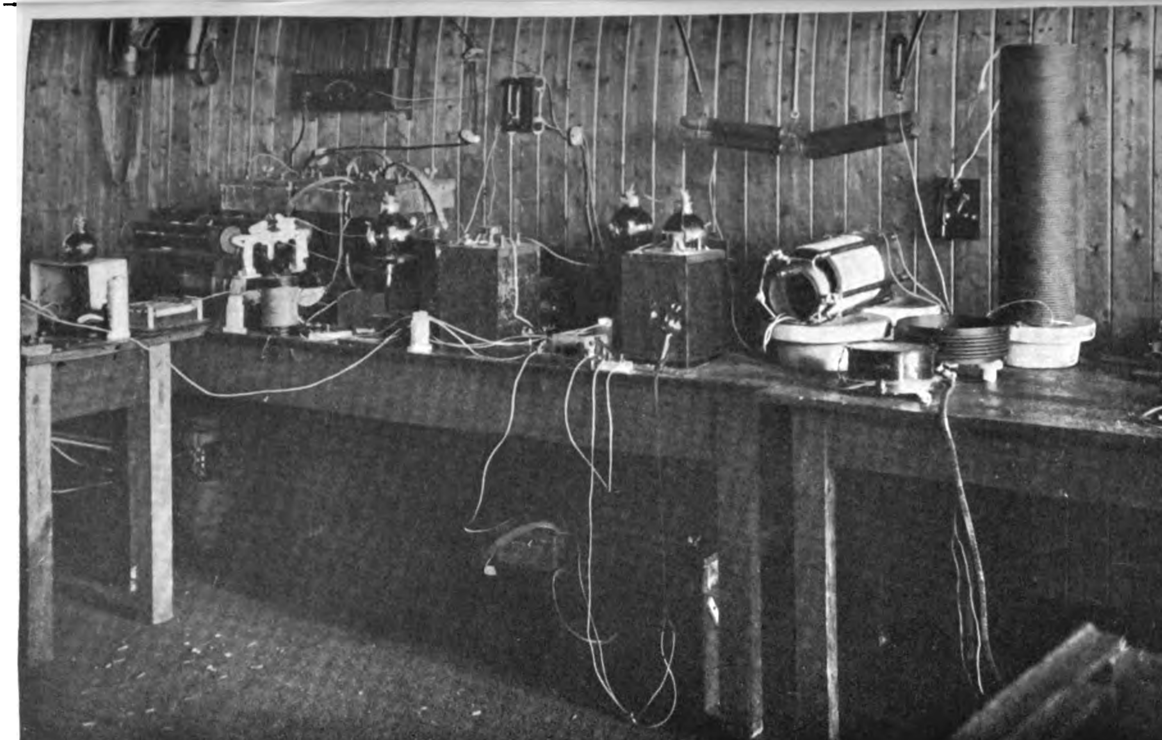
The present Convention shall come into execution on and from the 1st July, 1913, and shall remain in force for an indeterminable period and until the expiry of one year from the day upon which it is denounced.

Denunciation shall only take effect as regards the Government in whose name it is made. So far as the other Contracting Parties are concerned, the Convention shall remain in force.

ARTICLE 23.

Ratification.

The present Convention shall be ratified, a[illegible] the ratification thereof shall be deposited [illegible] London with as little delay as possible.



THE TRANSMITTING APPARATUS BY MEANS OF WHICH WIRELESS TELEPHONY BETWEEN BALLYBUNION (IRELAND) AND NOVA SCOTIA WAS ACCOMPLISHED IN 1919.

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If one or more of the High Contracting Parties shall not ratify the Convention, it shall not be less valid thereby for the Parties which have ratified it.

In witness whereof the respective Plenipotentiaries have signed the Convention in a single copy, which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each Party.

London, the 5th of July, 1912.

FINAL PROTOCOL.

At the time of proceeding to the signature of the Convention adopted by the International Radiotelegraphic Conference of London, the undersigned Plenipotentiaries have agreed as follows:—

I.

The exact nature of the adherence notified on the part of Bosnia-Herzegovina not being yet determined, it is recognised that Bosnia-Herzegovina is entitled to a vote, a decision at a later date being necessary on the question whether this vote belongs to Bosnia-Herzegovina in virtue of the second paragraph of Article 12 of the Convention, or whether this vote is accorded to it conformably to the provisions of the third paragraph of that Article.

II.

The following declaration is placed on record:—

The Delegation of the United States declares that its Government is under the necessity of abstaining from all action with regard to tariffs, because the transmission of radiotelegrams as well as of telegrams in the United States is undertaken, wholly or in part, by commercial or private companies.

III.

The following declaration was also placed on record:—

The Government of Canada reserves to itself the right to fix separately, for each of its coast stations, a total sea charge for radiotelegrams originating from North America and intended for any ship whatever, the coast charge amounting to three-fifths and the ship charge to two-fifths of such total charge.

In witness whereof the respective Plenipotentiaries have drawn up the present Final Protocol, which shall have the same force and the same validity as if the provisions thereof had been inserted in the text itself of the Convention to which it belongs, and they have signed it in a single copy which shall remain deposited in the archives of the British Government, and of which a copy shall be sent to each party.

London, the 5th of July, 1912.

SERVICE REGULATIONS ANNEXED TO THE INTERNATIONAL RADIOTELEGRAPHIC CONVENTION.

CONTENTS.

I.—ORGANISATION OF RADIOTELEGRAPHIC STATIONS.

1.

Choice of Apparatus.

The choice of radiotelegraphic apparatus and devices to be used by coast stations and ship stations is free. The installation of these stations must, as far as possible, be in keeping with scientific and technical progress.

II.

Wave-length.

Two wave-lengths, one of 600 and the other of 300 metres, shall be admitted for the service of general public correspondence. Every coast station open to this service must be equipped in such a way as to be able to use these two wave-lengths, of which one shall be designated as the normal wave-length of the station. During the whole time that it is ope

every coast station must be in a position to receive calls made by means of its normal wave-length. Nevertheless, for the correspondence covered by paragraph 2 of Regulation XXXV., use shall be made of a wave-length of 1,800 metres. Further, each Government may authorise the use, in a coast station, of other wave-lengths for the purpose of securing a long-range service or a service other than that of general public correspondence, and established in conformity with the provisions of the Convention, with the reservation that these wave-lengths do not exceed 600 metres, or that they do exceed 1,600 metres.

In particular, stations used exclusively for the despatch of signals intended to determine the position of ships must not use wave-lengths exceeding 150 metres.

III.
Equipment.

1. Every ship station must be equipped in such a way as to be able to use the wave-lengths of 600 metres and of 300 metres. The first shall be the normal wave-length, and may not be exceeded in transmission, the case of Regulation XXXV. (paragraph 2) excepted.

Use may be made of other wave-lengths not exceeding 600 metres in special cases, and subject to the approval of the Administrations to which the coast stations and ship stations concerned are subject.

2. During the whole time that it is open every ship station must be able to receive calls made by means of its normal wave-length.

3. Ships of small tonnage, in the case of which it would be materially impossible to use the wave-length of 600 metres for transmission, may be authorised to employ exclusively the wave-length of 300 metres; they must be able to receive by means of the wave-length of 600 metres.

IV.
Communication.

Communications between a coast station and a ship station, or between two ship stations, must be exchanged on both sides by means of the same wave-length. If, in a particular case, communication is difficult, the two stations may, by mutual consent, pass from the wave-length by means of which they are communicating to the other regulation wave-length. Both stations shall resume their normal wave-lengths when the radiotelegraphic exchange is finished.

V.
Map and Nomenclature.

1. The International Bureau shall prepare publish and revise periodically an official map showing the coast stations, their normal ranges, the principal lines of navigation, and the time normally taken by ships for the voyage between the various ports of call.

2. It shall draw up and publish a Nomenclature of the radiotelegraphic stations covered by Article I. of the Convention, and also periodical supplements for additions and modifications. This Nomenclature shall give, in the case of each station, the following information:—

1st.—For coast stations: the name, nationality, and geographical position indicated by the territorial subdivision and by the longitude and latitude of the place; for ship stations: the name and nationality of the ships; when the case arises, the name and address of the contractor.

2nd.—The call signal. (The call signals must be differentiated from one another, and each one must consist of a group of three letters.)

3rd.—The normal range.

4th.—The radiotelegraphic system with the characteristics of the system of discharge (musical sparks, tone expressed by the number of double vibrations, etc.).

5th.—The wave-lengths used (the normal wave-length to be underlined).

6th.—The nature of the services performed.

7th.—The hours of working.

8th.—When necessary the hour and method of despatch of time signals and meteorological telegrams.

9th.—The coast or ship charge.

3. There shall also be included in the Nomenclature such information relating to radiotelegraphic stations other than those covered by Article 1 of the Convention, as shall be communicated to the International Bureau by the Administrations to which such stations are subject, provided that these are either Administrations which are parties to the Convention, or, if they are not parties to it, have made the declaration provided for in Regulation XLVIII.

4. The following notations shall be adopted in documents for the use of the international service to designate radiotelegraph stations:—

PG—station open for general public correspondence.

PR—station open for restricted public correspondence.

P—private station.

O—station open only for official correspondence.

N—station always open.

X—station not having fixed working hours.

5. The name of a ship station indicated in the first column of the Nomenclature must be followed, when there is duplication of the name, by the call-signal of such station.

VI.
Experiments and Practice.

The exchange of unnecessary signals and words is forbidden to the stations covered by Article 1 of the Convention. Experiments and practice shall not be allowed in these stations, except so far as they do not disturb the service of other stations.

Practice must be carried out with wave-lengths different from those allowed for public correspondence, and with the minimum of power necessary.

VII.
Compulsory Conditions.

1. All stations are bound to exchange traffic with the minimum of energy necessary to ensure good communication.

2. Every coast and ship station must comply with the following conditions:—

(*a*) The waves emitted must be as pure and as little damped as possible.

In particular, the use of transmitting devices in which the production of the waves emitted is obtained by discharging the aerial direct by sparks (plain aerial) shall not be allowed except in cases of distress.

It may, however, be allowed in the case of certain special stations (for example, those of small ships) in which the primary power does not exceed 50 watts.

(*b*) The apparatus must be capable of transmitting and receiving at a speed at least equal

to 20 words per minute, the word being reckoned at the rate of five letters.

New installations bringing into play an energy of more than 50 watts shall be equipped in such a way that it may be possible to obtain easily several ranges less than the normal range, the shortest being of approximately 15 nautical miles. Installations already established bringing into play an energy of more than 50 watts shall be transformed as far as possible in such a manner as to satisfy the foregoing requirements.

(*c*) Receiving apparatus must allow of receiving, with the greatest possible amount of protection from disturbance, transmissions made with the wave-lengths specified in present Regulations, up to 600 metres.

3. Stations serving solely for determining the position of ships (*radiophares*) must not operate over an area of greater radius than 30 nautical miles.

VIII.

Power.

Independently of the general conditions specified in Regulation VII., ship stations must also satisfy the following conditions :—

(*a*) The power transmitted to the radiotelegraphic apparatus, measured at the terminals of the generator of the station, must not under normal circumstances exceed one kilowatt.

(*b*) Subject to the provisions of Regulation XXXV., par. 2, a power exceeding one kilowatt may be used if the ship is under the necessity of corresponding at a distance of more than 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be realised except by means of an increase of power.

IX.

Licences.

1. No ship station may be established or worked by private enterprise without a licence issued by the Government to which the ship is subject.

Stations on board ship having their port of register in a colony, possession, or protectorate may be described as being subject to the authority of such colony, possession, or protectorate.

2. Every ship station holding a licence issued by one of the contracting Governments must be regarded by the other Governments as having an installation fulfilling the conditions imposed by the present Regulations.

The competent authorities of the countries where the ship calls may demand the production of the licence. In default of such production, these authorities may ascertain whether the radiotelegraph installations of the ship satisfy the conditions imposed by the present Regulations.

When an Administration has practical evidence that a ship station is not fulfilling these conditions, it must, in every case, address a complaint to the Administration of the country to which the ship is subject. From that point onwards the procedure shall be, when necessary, as provided in Regulation XII., paragraph 2.

X.

Certificates.

1. The service of the ship station must be carried out by a telegraphist holding a certificate issued by the Government to which the ship is subject, or, in an emergency and for one voyage only, by another Government party to the convention.

2. There shall be two classes of certificates :—

The first-class certificate shall state the professional qualifications of the operator with regard to :—

(*a*) the adjustment of the apparatus and knowledge of their working ;

(*b*) transmitting and receiving by ear, at a speed which must not be less than 20 words per minute ;

(*c*) knowledge of the regulations applying to the exchange of radiotelegraphic communications.

The second-class certificate may be issued to a telegraphist who only attains to a speed in transmitting and receiving of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Telegraphists holding a second-class certificate may be allowed :—

(*a*) on ships only using radiotelegraphy for their own service and for the correspondence of the ship's company, in particular on fishing vessels ;

(*b*) on all ships as substitutes, provided that such ships have on board at least one operator holding a first-class certificate. Nevertheless, on ships placed in the first class indicated in Regulation XIII., the service must be carried out by at least two telegraphists holding first-class certificates.

In ship stations, transmissions may only be made by a telegraphist holding a first or second-class certificate, an exception being made in cases of emergency, in which it would be impossible to conform to this provision.

3. Further, the certificate shall testify that the Government has placed the telegraphist under the obligation of preserving the secrecy of correspondence.

4. The radiotelegraph service of the ship station shall be placed under the supreme authority of the captain of the ship.

XI.

Emergency Equipment.

Ships provided with radiotelegraph installations and placed in the first two classes indicated in Regulation XIII. shall be bound to have emergency radiotelegraph installations of which all the parts shall be placed in conditions of the greatest safety possible, such conditions to be determined by the Government which issues the licence. These emergency installations must have at command a source of power of their own, must be capable of being set working speedily, must be able to work for six hours at least, and must have a minimum range of 80 nautical miles in the case of ships in the first class, and of 50 miles in the case of those of the second class. This emergency installation shall not be required in the case of ships whose ordinary installation fulfils the conditions of the present article.

XII.

Responsibility for Breach of the Convention.

1. If an Administration has information of a breach of the Convention or of the Regulations committed in one of the stations which it has authorised, it shall ascertain the facts and fix the responsibility.

In the case of ship stations, if the responsibility rests on the operator, the Administration shall take the necessary steps, and, if necessary, shall withdraw the certificate. If it is shown that the breach was due to the condition of the

apparatus or to instructions given to the telegraphist, the same procedure shall be followed in respect of the licence issued to the ship.

2. In the event of repeated breaches by the ame ship, if the representations made to the Administration to which the ship is subject, by another Administration, remain without effect, the latter shall have the right, after notice given, of authorising its coast stations not to accept communications coming from the ship in question. In case of a difference between the two Administrations the question shall be submitted to arbitration on the request of one of the Governments concerned. The procedure is indicated in Article XVIII. of the Convention.

II.—HOURS OF SERVICE OF STATIONS.

XIII.

Land and Ship Stations.

(a) *Coast Stations.*

1. The service of coast stations shall be, as far as possible, permanent, day and night, without interruptions.

Nevertheless, certain coast stations may have a service of limited duration. Each Administration shall fix the hours of service.

2. Coast stations whose service is not permanent may not close before having transmitted all their radiotelegrams to the ships which are in their radius of action nor before having received from such ships all the radiotelegrams of which notice has been given. This provision shall also apply when ships notify their presence before work has actually ceased.

(b) *Ship Stations.*

3. Ship stations shall be placed in three classes:—

(1st) Stations always open;
(2nd) stations having limited working hours;
(3rd) stations having no fixed working hours.

During navigation, the following must remain permanently on the watch: (1st) ships of the first class; (2nd) those of the second class, during the hours that they are open for service; out of these hours, the latter stations must remain on the watch for the first 10 minutes of each hour. The stations of the third class are not bound to perform any regular "listening" service.

It shall fall to the Governments which issue the licences specified in Article IX. to fix the class in which the ship is to be placed, in respect of its obligations in the matter of keeping watch. This classification shall be mentioned in the licence.

III.—DRAWING UP AND HANDING IN OF RADIO-TELEGRAMS.

XIV.

Transmission from Ship to Land.

1. Radiotelegrams shall bear, as the first word of the preamble, the service instructions "radio."

2. In the transmission of radiotelegrams coming from a ship at sea, the date and the hour of the handing in at theship station shall be indicated in the preamble.

3. On forwarding over the telegraph system, the coast station shall insert, as the indication of the office of origin, the name of the ship of origin as it appears in the Nomenclature, and also, when the case arises, that of the last ship which served as an intermediary. These particulars shall be followed by the name of the coast station.

XV.

Transmission from Land to Ship.

1. The address of radiotelegrams intended for ships must be as complete as possible. It shall be compulsorily drawn up as follows:—

(*a*) Name or title of the addressee, with supplementary particulars if necessary.

(*b*) Name of the ship, as it appears in the first column of the Nomenclature.

(*c*) Name of the coast station, as it appears in the Nomenclature.

Nevertheless the name of the ship may be replaced, at the risks and perils of the sender, by the particulars of the voyage taken by such ship and determined by the names of the ports of origin and destination or by any other equivalent particulars.

2. In the address, the name of the ship, as it appears in the first column of the Nomenclature, shall be counted in every case, and independently of its length, as one word.

3. Radiotelegrams drawn up by means of the International Signal Code shall be forwarded to their destination without being de-coded.

IV.—CHARGES.

XVI.

Coast and Ship Charges.

1. The coast charge and the ship charge shall be fixed in accordance with the tariff per word pure and simple, on the basis of a fair remuneration for radiotelegraphic work, with optional application of a minimum charge per radiotelegram.

The coast charge may not exceed 60 centimes per word, nor the ship charge 40 centimes per word. Nevertheless each Administration shall have the right to authorise coast and ship charges higher than these maxima in the case of stations having a range of more than 400 nautical miles, or of stations exceptionally onerous on account of the material conditions of their installation or working.

The optional minimum charge per radiotelegram may not exceed the coast or ship charge for a radiotelegram of 10 words.

2. In the case of radiotelegrams originating from or intended for a country or exchanged directly with the coast stations of that country, the charge applying to the transmission over the lines of the telegraph system must not exceed, on the average, that of the inland rate of that country.

This charge shall be reckoned per word pure and simple, with an optional minimum charge not exceeding the charge for 10 words. It shall be notified in francs by the Administration of the country to which the coast station is subject.

In the cases of countries in the European system, with the exception of Russia and Turkey, there shall only be a single charge for the territory of each country.

XVII.

Retransmission.

1. When a radiotelegram originating from a ship and intended for *terra firma* passes through one or two ship stations, the charge shall include, in addition to those of the ship of

origin, the coast station, and the telegraph system, the ship charge of each of the ships taking part in the transmission.

2. The sender of a radiotelegram originating from *terra firma* and intended for a ship may require that his message be transmitted by way of one or two ship stations; he shall deposit for this purpose the amount of the radiotelegraphic and telegraphic charges, and besides, as a deposit, a sum to be fixed by the office of origin with a view to the payment to the intermediate ship stations of the transit charges fixed in paragraph 1; he must further pay, as he may choose, either the charge for a telegram of five words or the cost of postage of a letter to be sent by the coast station to the office of origin giving the information necessary to the liquidation of the sum deposited.

The radiotelegram shall then be accepted at the risks and perils of the sender; it shall bear before the address the paid additional particulars "x retransmissions telegraphe" or "x retransmissions lettre" (x representing the number of retransmissions required by the sender) accordingly as the sender desires that the information necessary for the liquidation of the deposit be furnished by telegram or by letter.

3. The charge for radiotelegrams originating from a ship, intended for another ship, and sent by way of one or two intermediate coast stations, shall include:—

The ship charges of both ships, the charge of the coast station or the two coast stations, as the case may be, and when necessary the telegraph charge appropriate to the transit between the two coast stations.

4. The charge for radiotelegrams exchanged between ships without the aid of a coast station includes the ship charges of the ship of origin and of the ship of destination, with the ship charges of the intermediate stations added thereto.

5. The coast and ship charges due to the stations of transit shall be the same as those fixed for such stations when these are stations of origin and destination. In no case shall they be collected more than once.

6. In the case of any intermediate coast station, the charge to be collected for the transit service shall be the highest of the coast charges appertaining to the direct exchange with the two ships in question.

XVIII.

Origin of Telegrams.

The country in whose territory is established a coast station acting as intermediary for the exchange of radiotelegrams between a ship station and another country shall be regarded, for the purpose of applying telegraphic charges, as the country of origin or of destination of such radiotelegrams and not as the country of transit.

V.—COLLECTION OF CHARGES.

XIX.

Tariffs.

1. The total charge for radiotelegrams shall be collected from the sender, with the exception—1st, of the cost of express delivery (Article LVIII., paragraph 1, of the Telegraph Regulations); 2nd, of the charges applying to inadmissible joinings or alterations of words noted by the office or station of destination (Article XIX., paragraph 9, of the Telegraph Regulations), these charges being collected from the addressee.

Ship stations must possess the necessary tariffs for this purpose. They shall have, however, the right to obtain information from coast stations with regard to charges for radiotelegrams for which they do not possess all the necessary information.

2. The counting of words by the office of origin shall be decisive in the case of radiotelegrams addressed to ships, and that of the ship station of origin shall be decisive in the case of radiotelegrams originating in ships, both for the purpose of transmission and for that of the international accounts. Nevertheless when the radiotelegram is worded wholly or in part either in one of the languages of the country of destination, in the case of radiotelegrams originating in ships, or in one of the languages of the country to which the ship belongs, in the case of radiotelegrams addressed to ships, and when the radiotelegram contains joinings or alterations of words contrary to the common use of that language, the office or ship station of destination, as the case may be, shall have the right to recover from the addressee the amount of the charge not collected. In the case of a refusal to pay the radiotelegram may be withheld.

VI.—TRANSMISSION OF RADIOTELEGRAMS.

(A) SIGNALS OF TRANSMISSION.

XX.

Code.

The signals employed shall be those of the International Morse Code.

XXI.

Distress Signals.

Ships in distress shall make use of the following signal,

• • • ▬ ▬ ▬ • • •

repeated at short intervals, followed by the necessary particulars.

As soon as a station hears the signal of distress, it must suspend all correspondence and must not resume the same until after it has made sure that the communication consequent upon the call for help is finished.

The stations which hear a call of distress must act according to indications given by the ship which makes the call, with regard to the order of messages or their cessation.

When, at the end of a series of distress calls, there is added the call signal of the particular station, the reply to the call is proper to that station only, unless that station does not reply. Failing the indication of a particular station in the call for help, every station that hears the call shall be bound to reply thereto.

XXII.

Information.

For the purpose of giving or asking information concerning the radiotelegraph service, stations must make use of the signals contained in the list appended to the present Regulations. (See p. 60.)

(B) ORDER OF TRANSMISSION.

XXIII.

Duration of Transmission.

Between two stations, radiotelegrams of the same class shall be transmitted singly in

alternate order or by series of several radiotelegrams, according to the instructions given by the coast station, on condition that the duration of the transmission of each series do not exceed 15 minutes.

(c) CALLING OF STATIONS AND TRANSMISSION OF RADIOTELEGRAMS.

XXIV.

Calls.

1. As a general rule, it shall be the ship station that calls the coast station, whether it has radiotelegrams to transmit or not.

2. In waters where the radiotelegraphic traffic is congested (the Channel, etc.), the call of a ship to a coast station may not, as a general rule, be made unless the latter is within the normal range of the ship station and the ship station has approached to a distance less than 75 per cent. of the normal range of the coast station.

3. Before proceeding to make a call, the coast station or the ship station must adjust its receiving system to the highest possible degree of sensitiveness, and must make sure that no other communication is being made within its radius of action ; if it is otherwise, it shall await the first break, unless it finds that its call is not likely to disturb the communication in progress. The same applies when the station wishes to answer a call.

4. For making a call, every station shall use the normal wave of the station to be called.

5. If, in spite of these precautions, a radiotelegraphic transmission be impeded, the call must cease on the first request made by a coast station open to public correspondence. This station must then indicate the approximate duration of the wait.

6. The ship station must make known to tiech coast station to which it has notified its presence the time at which it proposes to cease as operations, and also the probable duration of the interruption.

XXV.

Call Signals.

1. The call comprises the signal — • — • —, the call signal of the station called, sent three times, and the word "de," followed by the call signal of the sending station, sent three times.

2. The station called shall reply by giving the signal — • — • —, followed by the call signal, sent three times, of the calling station, by the word "de," its own call signal and the signal — • —

3. Stations which wish to enter into communication with ships, without, however, knowing the names of those ships which are within their radius of action, may use the signal — • — • — — • — (signal of enquiry). The provisions of paragraphs 1 and 2 are also applicable to the transmission of the signal of enquiry and to the reply to that signal.

XXVI.

Station failing to Reply.

If a station when called does not reply when the call (Regulation XXV.) has been sent three times at intervals of 2 minutes, the call may not be resumed until after an interval of 15 minutes, the station making the call first making sure of the fact that no radiotelegraphic communication is in progress.

XXVII.

Use of High Power.

Every station which has to make a transmission necessitating the use of high power shall first send out three times the warning signal — — • • — —, with the minimum of power necessary to reach the neighbouring stations. It shall not then begin to transmit with the high power until 30 seconds after sending the warning signal.

XXVIII.

Particulars regarding Reception.

1. As soon as the coast station has replied, the ship station shall furnish it with the following information if it has messages to transmit to it ; this information shall also be given when the coast stations ask for it :—

(*a*) The approximate distance, in nautical miles, of the vessel from the coast station ;

(*b*) The position of the ship given in a concise form and adapted to the circumstances of the individual case ;

(*c*) The next port at which the ship will touch ;

(*d*) The number of radiotelegrams if they are of normal length or the number of words if the messages are of exceptional length.

The speed of the ship in nautical miles shall be given specially at the express request of the coast station.

2. The coast station shall reply giving, as provided in paragraph 1, either the number of telegrams or the number of words to be transmitted to the ship and also the order of transmission.

3. If transmission cannot take place immediately the coast station shall inform the ship station of the approximate length of the wait.

4. If a ship station when called cannot receive for the moment it shall inform the calling station of the approximate length of the wait.

5. In the case of exchanges between two ship stations it shall rest with the station called to fix the order of transmission.

XXIX.

Exchange of Messages.

When a coast station is called by several ship stations, it shall decide the order in which these stations shall be allowed to exchange their messages.

In the regulation of this order, the coast station shall be guided solely by the necessity for allowing every station concerned to exchange the greatest possible number of radiotelegrams.

XXX.

Order of Transmission.

Before beginning to exchange correspondence, the coast station shall inform the ship station whether the transmission is to be made in alternate order by series (Regulation XXIII.) ; it shall then begin to transmit, or shall follow up these instructions by the signal — • —

XXXI.

Initial and Final Signals.

The transmission of a radiotelegram shall be preceded by the signal — • — • — and ended by the signal • — • — • followed by the call signal of the sending station and by the signal — • —

In the case of a series of radiotelegrams, the call-letter of the sending station and the signal — • — shall only be given at the end of the series.

XXXII.

Lengthy Messages.

When the radiotelegram to be transmitted contains more than 40 words, the sending

station shall interrupt the transmission by the signal ● ● ▬ ▬ ● ● after each series of 20 words or thereabouts, and it shall not resume transmission until after having obtained from the station in correspondence the repetition of the last word clearly received, followed by the said signal, or, if the reception is clear, the signal ▬ ● ▬

In the case of transmission in series, the acknowledgment of receipt shall be given after each radiotelegram.

Coast stations engaged in transmitting long radiotelegrams must suspend transmission at the end of each period of 15 minutes, and must remain silent during a period of 3 minutes before continuing transmission.

Coast and ship stations which work in the conditions laid down in Regulation XXXV., paragraph 2, must suspend work at the end of each period of 15 minutes, and keep watch on the wave length of 600 metres during a period of 3 minutes before continuing transmission.

XXXIII.

Doubtful Messages.

1. When the signals become doubtful, all possible resources must be drawn upon to accomplish transmission. To this end, the radiotelegram shall be transmitted three times at most, at the request of the receiving station. If in spite of this triple transmission the signals are still unintelligible, the radiotelegram shall be cancelled.

If the acknowledgment of receipt does not come to hand, the sending station shall again call the station with which it is in correspondence. When no reply is made after three calls, the transmission shall not be persevered with. In such case, the sending station shall have the right to obtain the acknowledgment of receipt through the medium of another radiotelegraph station, using, when necessary, the lines of the telegraph system.

2. If the receiving station considers that, in spite of defective receiving, the radiotelegram can be delivered, it shall insert at the end of the preamble the service advice "Reception douteuse," and shall forward the radiotelegram. In such case, the Administration to which the coast station is subject shall claim the charges, in conformity with Clause XLII. of the present Regulations. Nevertheless, if the ship station later on transmits the radiotelegram to another coast station of the same Administration, the latter can only claim the charges appertaining to a single transmission.

(D) ACKNOWLEDGMENT OF RECEIPT AND END OF WORK.

XXXIV.

Acknowledgment of Reception and Completion.

1. The acknowledgment of receipt shall be given in the form prescribed by the International Telegraph Regulations; it shall be preceded by the call signal of the sending station and followed by the call signal of the receiving station.

2. The end of the work between two stations shall be indicated by each one of them by means of the signal ● ● ● ▬ ● ▬ followed by its own call signal.

(E) ROUTE TO BE TAKEN BY RADIOTELEGRAMS.

XXXV.

Route of Transmission.

1. As a general principle, the ship station shall transmit its radiotelegrams to the nearest coast station.

However, if the ship station has the choice between several coast stations at equal or nearly equal distances, it shall give the preference to that which is established on the territory of the country of destination or of normal transit of its radiotelegrams.

2. Nevertheless, a sender on board a ship shall have the right to indicate the coast station by which he wishes his radiotelegram to be forwarded. The ship station shall then wait until this coast station is the nearest.

Exceptionally, transmission may be made to a more distant coast station, provided :—

(*a*) that the radiotelegram is intended for the country in which such coast station is situated and that it comes from a ship subject to that country;

(*b*) that for calls and transmission both stations use a wave-length of 1,800 metres;

(*c*) that transmission by this wave-length does not disturb any transmission made, by means of the same wave-length, by a nearer coast station;

(*d*) that the ship station is more than 50 nautical miles distant from any coast station shown in the Nomenclature. The distance of 50 miles may be reduced to 25 miles, subject to the reservation that the maximum power at the terminals of the generator do not exceed 5 kilowatts and that the ship stations be established in conformity with Regulations VII. and VIII. This reduction of distance shall not apply in the seas, bays or gulfs of which the shores belong to one country only and of which the opening to the high sea is less than 100 miles wide.

VII.—DELIVERY OF RADIOTELEGRAMS.

XXXVI.

Delivery.

When for any cause whatsoever a radiotelegram coming from a ship at sea and intended for *terra firma* cannot be delivered to the addressee an advice of non-delivery shall be sent out. This advice shall be transmitted to the coast station which received the original radiotelegram. The latter, after verifying the address, shall forward the advice to the ship, if possible, and, if need be, by way of another coast station of the same country or of a neighbouring country.

When a radiotelegram, having arrived at the ship station, cannot be delivered, that station shall inform the office or ship station of origin by means of a service advice. In the case of radiotelegrams coming from *terra firma* this advice shall be transmitted, whenever possible, to the coast station by way of which the radiotelegram passed, or, if necessary, to another coast station of the same country or of a neighbouring country.

XXXVII.

Non-delivery.

If the ship to which the radiotelegram is addressed has not notified its presence to the coast station within the time specified by the sender, or, in the absence of such specification, up to the morning of the eighth day following, such coast station shall give notice of the fact to the office of origin, which shall inform the sender of the same.

This latter shall have the option of requiring by paid service advice, telegraphic or postal, addressed to the coast station, that his radiotelegram be kept for a fresh period of nine days,

for transmission to the ship, and so on. In the absence of such request the radiotelegram shall be returned as undelivered at the end of the ninth day (the day of handing in not to be included).

However, if the coast station is sure that the ship has left its radius of action before the station could have transmitted the radiotelegram to it, such station shall immediately inform the office of origin, which shall without delay advise the sender of the cancellation of the message. Nevertheless, the sender may, by paid service advice, request the coast station to transmit the radiotelegram when the ship next passes.

VIII.—SPECIAL RADIOTELEGRAMS.

XXXVIII.

Special Messages.

The following only shall be allowed :—

1st, *Reply Paid Radiotelegrams.*—These radiotelegrams shall bear, before the address, the indication, "Réponse payée," or "RP," completed by the mention of the amount paid in advance for the reply—for example: "Réponse payée fr. x," or "Rp, fr. x."

The reply voucher issued on board a ship shall give the right to send, up to the limit of its value, a radiotelegram to any address whatever from the ship station which issues such voucher.

2nd, *Collated Radiotelegrams.*

3rd, *Express Delivery Radiotelegrams.*—But only in cases in which the amount of the cost of express delivery is collected from the addressee. The countries which cannot adopt these radiotelegrams must notify the fact to the International Bureau. Radiotelegrams for express delivery, with collection of the cost from the sender, may be allowed when they are intended for the country in whose territory the corresponding coast station is situated.

4th, *Radiotelegrams for Delivery by Post.*

5th, *Multiple Radiotelegrams.*

6th, *Radiotelegrams with Acknowledgement of Receipt.*—But only with regard to notification of the date and time at which the coast station has transmitted to the ship station the telegram addressed to the latter.

7th, *Paid Service Advices.*—Except those asking for repetition of information. Nevertheless, all paid service advices shall be allowed on the route over the telegraph lines.

8th, *Urgent Radiotelegrams.*—But only in transmission over the telegraph lines, and subject to the application of the International Telegraph Regulations.

XXXIX.

Postal Radiotelegrams.

Radiotelegrams may be transmitted by a coast station to a ship, or by a ship to another ship, with the object of being forwarded by post, the posting to take place from a port of call of the receiving ship.

The address of these radiotelegrams must be drawn up as follows :—

1st, Paid instruction "poste," followed by the name of the port where the radiotelegram is to be posted;

2nd, Full name and address of the addressee;

3rd, Name of the ship station which is to carry out the posting;

4th, When necessary, name of the coast station.

Example: Poste Buenos Aires, Martinez, 14 Calle Prat, Valparaiso, Avon Lizard.

The charge shall include, as well as the radiotelegraph and telegraph charges, a sum of 25 centimes for the postage of the radiotelegram.

IX.—ARCHIVES.

XL.

Records.

The originals of radiotelegrams, as well as the documents relating thereto, retained by the Administrations, shall be kept with all necessary precautions in respect of secrecy for at least fifteen months, counting from the month following that in which the radiotelegrams were handed in.

These originals and documents shall be sent, as far as possible, at least once a month by the ship stations to the Administrations to which they are subject.

X.—REFUNDS AND REIMBURSEMENTS.

XLI.

Refund of Charges.

With regard to refunds and reimbursements, the provisions of the International Telegraph Regulations shall apply, bearing in mind the restrictions laid down in Clauses XXXVIII. and XXXIX. of the present Regulations and subject to the following reservations :—

The time occupied in radiotelegraphic transmission, and also the time during which the radiotelegram remains at the coast station in the case of radiotelegrams addressed to ships, or in the ship station in the case of radiotelegrams originating in ships, shall not be counted in the period of delay giving rise to refunds and reimbursements.

If the coast station informs the office of origin that a radiotelegram cannot be transmitted to the ship to which it is addressed, the Administration of the country of origin shall immediately initiate the reimbursement to the sender of the coast and ship charges in respect of such radiotelegram. In this case, the charges reimbursed shall not appear in the account for which provision is made by Regulation XLII., but the radiotelegram shall be mentioned therein as a memorandum.

Reimbursements shall be borne by the various Administrations and private enterprises which have taken part in the forwarding of the radiotelegram, each one of them relinquishing its share of the charge. Nevertheless, radiotelegrams falling under the provision of Articles VII. and VIII. of the Convention of St. Petersburg shall remain subject to the provisions of the International Telegraph Regulations, except when it is due to an error of service that such radiotelegrams have been accepted.

When the acknowledgment of receipt of a radiotelegram has not reached the station which transmitted the message, the charge shall not be refunded until it has been proved that the radiotelegram is one which gives occasion for reimbursement.

XI.—ACCOUNTING.

XLII.

Accounts.

1. Coast and ship charges shall not be entered in the accounts provided for by the International Telegraph Regulations.

The accounts relating to these charges shall be settled by the Administrations of the countries concerned. They shall be prepared by the Administrations to which the coast stations belong, and communicated by them to the Administrations concerned. In cases in which the working of the coast stations is independent of the Administration of the country, the person working these stations may be substituted in respect of accounts for the Administration of such country.

2. As to transmission over the lines of the telegraph system the radiotelegram shall be treated in respect of accounts in conformity with the Telegraph Regulations.

3. In the case of radiotelegrams originating from ships the Administration to which the coast station is subject shall debit the Administration to which the ship station of origin is subject with the coast and ordinary telegraph charges, the total charges collected for prepaid replies, the coast and telegraph charges collected for collations, the charges appertaining to express delivery (in the case provided for in Regulation XXXVIII.) or delivery by post, and with those collected for supplementary copies (TM). The Administration to which the coast station is subject shall credit, when the case arises, through the channel of the telegraph accounts and through the medium of the offices which have taken part in the transmission of the radiotelegrams, the Administration to which the office of destination is subject with the total charges relating to prepaid replies. With regard to telegraph charges and charges relating to express delivery or delivery by post, and to supplementary copies, the procedure shall be in conformity with the telegraph regulations, the coast station being regarded as the telegraph office of origin.

In the case of radiotelegrams intended for a country lying beyond that to which the coast station belongs, the telegraph charges to be liquidated conformably to the above provisions are those which arise either from tables "A" and "B" appended to the International Telegraph Regulations or from special arrangements concluded between the Administrations of adjoining countries, and published by those Administrations, and not the charges which might be made under the special provisions of Regulations XXIII. (paragraph 1) and XXVII. (paragraph 1) of the Telegraph Regulations.

In the case of radiotelegrams and paid-service advices addressed to ships, the Administration to which the office of origin is subject shall be debited directly by that to which the coast station is subject with the coast and ship charges. Nevertheless, the total charges appertaining to prepaid replies shall be credited, if there is occasion, from country to country through the channel of the telegraph accounts, until they reach the Administration to which the coast station is subject. In respect of the telegraph charges and charges relating to delivery by post and for supplementary copies, the procedure shall be in conformity with the telegraph regulations. The Administration to which the coast station is subject shall credit that to which the ship of destination is subject with the ship charge, if there is occasion, with the charges belonging to the intermediate ship stations, with the total charge collected for prepaid replies, with the ship charge relating to collation, and also with the charges made for preparing supplementary copies and for delivery by post.

The paid service advices, and the prepaid replies themselves, shall be treated, in the radiotelegraph accounts, in all respects like other radiotelegrams.

In the case of radiotelegrams forwarded by means of one or two intermediate ship stations, each of the latter shall debit the ship station of origin, if the radiotelegram is one coming from a ship, or the ship station of destination if the radiotelegram is one intended for a ship, with the ship charge due to it for transit.

4. In principle the settlement of account appertaining to exchanges between ship stations shall be made directly as between the companies working those stations, the station of origin being debited by the station of destination.

5. The monthly accounts serving as a basis for the special accounting in respect of radiotelegrams shall be drawn up radiotelegram by radiotelegram, with all necessary particulars, and within a period of six months counting from the month to which they belong.

6. The Governments reserve to themselves the option of making between themselves and with private companies (contractors working radiotelegraphic stations, shipping companies, etc.) special arrangements with a view to the adoption of other provisions respecting accounts.

XII.—INTERNATIONAL BUREAU.

XLIII.

Expenses.

The supplementary expenses resulting from the work of the International Bureau in connection with radiotelegraphy must not exceed 80,000 fcs. per annum, not including special expenses to which the meeting of an International Conference gives rise. The Administrations of the contracting States shall be, for purposes of contribution towards the expenses, divided into six classes as follows :—

1st Class.—Union of South Africa, Germany, United States of America, Alaska, Hawaii, and the other American possessions in Polynesia, the Philippine Islands, Porto Rico and the American possessions in the Antilles, the zone of the Panama Canal, the Argentine Republic, Australia, Austria, Brazil, Canada, France, Great Britain, Hungary, British India, Italy, Japan, New Zealand, Russia, Turkey.

2nd Class.—Spain.

3rd Class.—Russian Central Asia (littoral of the Caspian Sea), Belgium, Chili, Chosen, Formosa, Japanese Sakhalin and the leased territory of Kwantung, Dutch Indies, Norway, Holland, Portugal, Roumania, Western Siberia (littoral of the Arctic Ocean), Eastern Siberia (littoral of the Pacific Ocean), Sweden.

4th Class.—Ex-German East Africa, Ex-German South-West Africa, The Cameroons, Togoland, Ex-German Pacific Protectorates, Denmark, Egypt, Indo-China, Mexico, Siam, Uruguay.

5th Class.—French West Africa, Bosnia-Herzegovina, Bulgaria, Greece, Madagascar, Tunis.

6th Class.—French Equatorial Africa, Portuguese West Africa, Portuguese East Africa and the Portuguese possessions in Asia, Bokhara, the Belgian Congo, the Colony of

Curaçao, the Spanish Colony of the Gulf of Guinea, Erythrea, Khiva, Morocco, Monaco, Persia, San Marino, Italian Somaliland.

XLIV.

Work of Berne Bureau.

The various Administrations shall forward to the International Bureau a form modelled on that hereto appended (see page 59) and containing the particulars enumerated in the form with regard to the stations covered by Clause V. of the Regulations. Any modifications which may take place and additions shall be communicated by the Administrations to the International Bureau from the 1st to the 10th of each month. With the help of these communications the International Bureau will draw up the Nomenclature provided for by Regulation V. The Nomenclature shall be distributed to the Administrations concerned. It may also, with the supplements relating thereto, be sold to the public at cost price.

The International Bureau shall take care that the adoption of identical call signals for radiotelegraph stations be avoided.

XIII.—METEOROLOGICAL TRANSMISSIONS, TIME SIGNALS, AND OTHER TRANSMISSIONS.

XLV.

Meteorological and Other Messages.

1. The Administrations shall take the necessary steps to supply their coast stations with meteorological telegrams containing the particulars of interest to the district of such stations. These telegrams, the text of which must not exceed twenty words, shall be sent to the ships which ask for them. The charge for these meteorological telegrams shall be carried to the account of the ships to which they are addressed.

2. The meteorological observations, made by certain ships appointed for that purpose by the country to which they belong, may be sent once a day as paid service advices to the coast stations authorised to receive them by the Administrations concerned, who shall also appoint the meteorological offices to which these observations shall be addressed by the coast station.

3. Time signals and meteorological telegrams shall be transmitted in succession one to another in such a way that the total duration of their transmission does not exceed ten minutes. In principle, while they are being sent, all radiotelegraph stations, transmission by which might disturb the reception of these signals and telegrams, shall keep silent so as to allow all stations which desire to do so to receive these telegrams and signals. Exception shall be made in the case of distress calls and State telegrams.

4. The Administrations shall facilitate the communication to the marine information agencies which they may appoint of the information respecting wrecks and casualties at sea, or presenting a general interest for navigation, which the coast stations can communicate regularly.

XIV.—MISCELLANEOUS PROVISIONS.

XLVI.

Interference.

Transmission exchanged between ship stations must be carried out in such a way as not to interfere with the service of coast stations, as the latter must have, as a general rule, right of priority for public correspondence.

XLVII.

Compulsory Retransmission.

Coast stations and ship stations shall be bound to take part in the retransmission of radiotelegrams in cases in which communication cannot be established directly between the stations of origin and destination.

Nevertheless, the number of transmissions shall be limited to two.

In the case of radiotelegrams intended for *terra firma* use may only be made of retransmissions to reach the nearest coast station.

Retransmission shall be in all cases subject to the condition that the intermediate station which receives the radiotelegram in transit is in a position to send it on.

XLVIII.

Non-Contracting Governments.

If the transmission of a radiotelegram is carried out partly on the telegraph lines or through radiotelegraph stations belonging to a non-contracting Government, such radiotelegram may be sent forward, subject to the reservation that at least the Administrations to which these lines or stations belong shall have declared that they are willing to apply, when the case arises, the provisions of the Convention and of the Regulations, which are indispensable, in order that radiotelegrams may be regularly forwarded, and that accounting may be assured.

Such declaration shall be made to the International Bureau, and brought to the knowledge of the offices of the Telegraph Union.

XLIX.

Operation of Modifications to Regulations.

The modifications of the present Regulations which may be rendered necessary in consequence of the decisions of future Telegraph Conferences shall come into force on the date fixed for the application of the provisions decided upon by each one of these later Conferences.

L.

Application of International Telegraph Regulations.

The provisions of the International Telegraph Regulations shall apply by analogy to radiotelegraph correspondence in so far as they are not contrary to the provisions of the present Regulations.

The following in particular apply to radiotelegraph correspondence :—

The provisions of Article XXVII., paragraphs 3 to 6, of the Telegraph Regulations referring to the collection of charges ; those of Articles XXXVI. and XLI. referring to the indication of the route to be taken ; those of Articles LXXV., paragraph 1, LXXVIII., paragraphs 2 to 4, and LXXIX., paragraphs 2

to 4, relating to preparing of accounts. Nevertheless, first, the period of six months provided by paragraph 2 of Article LXXIX. of the Telegraph Regulations for the verification of accounts is extended to nine months in the case of radiotelegrams; second, the provisions of Article XVI., paragraph 2, are not considered as authorising the free transmission by radiotelegraph stations of service telegrams relating exclusively to the telegraph service, nor the free transmission over the lines of the telegraph system of service telegrams relating exclusively to the radiotelegraph service; third, the provisions of Article LXXIX., paragraphs 3 and 5, do not apply to radiotelegraph accounting. For the purposes of applying the provisions of the Telegraph Regulations coast stations shall be regarded as offices of transit, except when the Radiotelegraphic Regulations stipulate expressly that these stations are to be considered as offices of origin or destination.

Conformable to Article II. of the Convention of London the present regulations will come into force on July 1st, 1913.

In witness whereof the respective Plenipotentiaries have signed these Regulations on a single copy, which will remain deposited in the Archives of the British Government, and of which a copy will be sent to each party.

APPENDIX

I.

TABLE REFERRED TO IN REGULATION XLIV. (p. 58).

(*a*) Coast Stations.

Name.	Nationality.	Geographical Position. E=East longitude; O=West longitude; N=North latitude; S=South latitude. Territorial subdivisions.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in metres (the normal wave-length is underlined).

Nature of Services effected.	Working hours (Time according to the Meridian).	Coast Charge.		Observations (if occasion, Time and Method of sending Time-Signals and Meteorological Telegrams).
		Per Word in Francs.	Minimum per Radiotelegram in Francs.	

(*b*) Ship Stations.

Name.	Nationality.	Call Signal.	Normal Range in Nautical Miles.	Radiotelegraph System, with the characteristics of the System of emission.	Wave-lengths in Metres.

Nature of Services effected.	Working Hours.	Ship Charge.		Observations (if occasion, Name and Address of the person working the Station).
		Per Word in Francs.	Minimum per Radiotelegram in Francs.	

1° Warships.

2° Merchant Ships.

II.

LIST OF ABBREVIATIONS TO BE USED IN RADIOTELEGRAPH TRANSMISSIONS

(referred to in Article XXII., p. 53).

Abbreviation. 1.	Question. 2.	Answer or Advice. 3.
— · — · — — · — (CQ)	.. .. ..	Inquiry signal employed by a station which desires to correspond.
— · — · (TR)	.. ..	Signal announcing the sending of indications concerning a ship station (Article XXVIII.).
— — · · — — (!)	.. ..	Signal indicating that a station is about to send with high power.
PRB	Do you wish to communicate with my station by means of the International Signal Code ?	I wish to communicate with your station by means of International Signal Code.
QRA	What is the name of your station ? ..	This station is......
QRB	How far are you from my station ? ..	The distance between our stations is...... nautical miles.
QRC	What are your true bearings ?	My true bearings are...... degrees.
QRD	Where are you bound ?	I am bound for......
QRF	Where are you coming from ?	I am coming from ......
QRG	To what company or line of navigation do you belong ?	I belong to......
QRH	What is your wave-length ?	My wave-length is......metres.
QRJ	How many words have you to transmit ?	I have......words to transmit.
QRK	How are you receiving ?	I am receiving well.
QRL	Are you receiving badly ? Shall I transmit 20 times · · · — · so that you can adjust your apparatus.	I am receiving badly. Transmit 20 times · · · — · so that I can adjust my apparatus.
QRM	Are you disturbed ?	I am disturbed.
QRN	Are the atmospherics very strong ..	The atmospherics are very strong.
QRO	Shall I increase my power ?	Increase your power.
QRP	Shall I decrease my power ?	Decrease your power.
QRQ	Shall I transmit faster ?	Transmit faster.
QRS	Shall I transmit more slowly ? ..	Transmit more slowly.
QRT	Shall I stop transmitting ?	Stop transmitting.
QRU	Have you anything for me ?	I have nothing for you.
QRV	Are you ready ?	I am ready. All is in order.
QRW	Are you busy ?	I am busy with another station (or with ...... please do not interrupt).
QRX	Shall I wait ?	Wait. I will call you at ...... o'clock (or when I want you).
QRY	What is my turn ?	Your turn is No. ....
QRZ	Are my signals weak ?	Your signals are weak.
QSA	Are my signals strong	Your signals are strong.
QSB	Is my tone bad ?	The tone is bad.
	Is my spark bad ?	The spark is bad.
QSC	Is the spacing bad ?	The spacing is bad.
QSD	Let us compare watches. My time is ...... What is your time ?	The time is......
QSF	Are the radiotelegrams to be transmitted alternately or in series ?	Transmission will be in alternate order.
QSG	—	Transmission will be in series of five radiotelegrams.
QSH	—	Transmission will be in series of ten radiotelegrams.
QSJ	What is the charge to collect for ...... ?	The charge to collect is......
QSK	Is the last radiotelegram cancelled ? ..	The last radiotelegram is cancelled.
QSL	Have you got the receipt ?	Please give a receipt.
QSM	What is your true course ?	My true course is...... degrees.
QSN	Are you communicating with land ? ..	I am not communicating with land.
QSO	Are you in communication with another station (or with ......) ?	I am in communication with ...... (through the medium of ......).
QSP	Shall I signal to .... that you are calling him ?	Inform ...... that I am calling him.
QSQ	Am I being called by...... ?	You are being called by......
QSR	Will you dispatch the radiotelegram ? ..	I will forward the radiotelegram.
QST	Have you received a general call ? ..	General call to all stations.
QSU	Please call me when you have finished (or at......o'clock)	I will call you when I have finished.
QSV	Is public correspondence engaged ? ..	Public correspondence is engaged. Please do not interrupt.
QSW	Must I increase the frequency of my spark ?	Increase the frequency of your spark.
QSX	Must I diminish the frequency of my spark ?	Diminish the frequency of your spark.

Abbreviation. 1	Question. 2.	Answer or Advice. 3.
QSY	Shall I transmit with a wave-length of ...... metres?	Let us transfer to the wave-length of .... metres.
QSZ	.. ..	Transmit each word twice. I have difficulty in receiving your signals.
QTA	.. ..	Transmit each radiotelegram twice. I have difficulty in receiving your signals; or Repeat the radiotelegram you have just sent. Reception doubtful.

When an abbreviation is followed by a mark of interrogation it applies to the question indicated in respect of that abbreviation.

In addition to these signals, which, it will be observed, are uniform in construction, the following signals of the International Telegraph Code may be used in these communications:—

● ● ▬ ▬ ● ● " Repeat " sign (as well as mark of interrogation).
● ● ● ▬ ● Understood.
● ▬ ● ● ● Wait.

EXAMPLES.

Station		
A	QRA?	What is the name of your station?
B	QRA Campania	This is the Campania.
A	QRG?	To what company or line of navigation do you belong?
B	QRG Cunard. QRZ	I belong to the Cunard Line. Your signals are weak.

Station A then increases the power of its transmitter and sends:

A	QRK?	How are you receiving?
B	QRK	I am receiving well.
	QRB 80	The distance between our stations is 80 nautical miles.
	QRC 62	My true bearings are 62 degrees, etc.

The following States have subsequently adhered to the Convention but were not represented thereat:—

Bolivia	New Caledonia
Colombia	Newfoundland
Cuba	Norfolk Island
Cyrenaica	Panama
French Oceania	Papua
Guadeloupe	Peru
Guatemala	Sarawak
Iceland	Tonga Islands
Martinique	Tripoli
Mexico	

INTERNATIONAL CONVENTION

ON

SAFETY OF LIFE AT SEA

London, January 20th, 1914.

THE London International Conference on the Safety of Life at Sea, by which the Convention signed on January 20th, 1914, has been drawn up, met for the first time on November 12th, 1913, at the Foreign Office, London. The suggestion that such a Conference should be held emanated from the ex-German Emperor, and the task of convening it was undertaken by the British Government. The following States were represented: Great Britain, Germany, the United States, Australia, Austria-Hungary, Belgium, Canada, Denmark, Spain, France, Italy, Japan, Norway, the Netherlands, Russia, Sweden, and New Zealand. The delegations from the different States were composed, not of the representatives of the shipping trade, but of administrators, experts and jurists.

The late Lord Mersey was appointed Chairman of the Conference. To deal with the specific subjects submitted to it the Conference appointed five sub-committees, together with a sixth sub-committee for drafting the Convention, which was to embody the recommendations of the Committees as approved by the whole Conference.

The Convention contains seventy-four articles, of which we present below the articles governing the use of wireless telegraphy :—

CHAPTER I.

Safety of Life at Sea.

Article 1.—The High Contracting Parties undertake to give effect to the provisions of this Convention, for the purpose of securing safety of life at sea, to promulgate all regulations and to take all steps which may be necessary to give the Convention full and complete effect.

The provisions of this Convention are completed by Regulations which have the same force and take effect at the same time as the Convention. Every reference to the Convention implies at the same time a reference to the Regulations annexed thereto.

CHAPTER II.

Ships to which this Convention Applies.

Article 2.—Except where otherwise provided by this Convention, the merchant ships of any of the States of the High Contracting Parties, which are mechanically propelled, which carry more than 12 passengers, and which proceed from a port of one of the said States to a port situated outside that State, or conversely, are subject to the provisions of this Convention. Ports situated in the Colonies, Possessions, or Protectorates of the High Contracting Parties are considered to be ports outside the States of the High Contracting Parties.

Persons who are on board by reason of *force majeure* or in consequence of the obligation laid upon the master to carry shipwrecked or other persons, are not deemed to be passengers.

Article 3.—There are excepted from this Convention, save in the cases where the Convention otherwise provides, ships making voyages specified in a schedule to be communicated by each High Contracting Party to the British Government at the time of ratifying the Convention.

No schedule may include voyages in the course of which the ships go more than 200 sea miles from the nearest coast.

Each High Contracting Party has the right subsequently to modify its schedule of voyages in conformity with this Article on condition that it notifies the British Government of such modification.

Each High Contracting Party has the right to claim from another Contracting Party the benefit of the privileges of the Convention for all of its ships which are engaged in any one of the voyages mentioned in its own schedule. For this purpose the Party claiming such benefit shall impose on the said ships the obligations prescribed by the Convention in so far as, having regard to the nature of the voyage, these obligations would not be unnecessary or unreasonable.

Article 4.—No ship, not subject to the provisions of the Convention at the time of its departure, can be subjected to the Convention in the course of its voyage, if stress of weather or any other cause of *force majeure* compels it to take refuge in a port of one of the States of the High Contracting Parties.

CHAPTER III.

Safety of Navigation.

Article 5.—When the expression "every ship" is used in this chapter and in the corresponding part of the annexed Regulations, it includes all merchant ships, whether they are the ships defined in Article 2 or not, which belong to any of the Contracting States.

Article 6.—The High Contracting Parties undertake to take all steps to ensure the destruction of derelicts in the northern part of the Atlantic Ocean east of a line drawn from Cape Sable to a point situated in latitude 34° north and longitude 70° west. Further, they will establish in the North Atlantic with the least possible delay a service for the study and observation of ice conditions and a service of ice patrol. For this purpose:

Two vessels shall be charged with these three services.

During the whole of the ice season they shall be employed in ice patrol.

During the rest of the year the two vessels shall be employed in the study and observation of ice conditions and in the destruction of derelicts; nevertheless the study and observation of ice conditions shall be effectively maintained, in particular from the beginning of February to the opening of the ice season.

While the two vessels are employed in ice patrol the High Contracting Parties, to the extent of their ability and so far as the exigencies of the Naval Service will permit, will send warships or other vessels to destroy any dangerous derelicts, if this destruction is considered necessary at that time.

Article 7.—The Government of the United States is invited to undertake the management of the three services of derelict destruction, study and observation of ice conditions, and ice patrol. The High Contracting Parties which are specially interested in these services, and whose names are given below, undertake to contribute to the expense of establishing and working the said services in the following proportions:

	Per cent.
Austria-Hungary	2
Belgium	4
Canada	2
Denmark	2
France	15
Germany	15
Great Britain	30
Italy	4
Netherlands	4
Norway	3
Russia	2
Sweden	2
United States of America	15

Each of the High Contracting Parties has the right to discontinue its contribution to the expense of working these services after September 1st, 1916. Nevertheless, the High Contracting Party which avails itself of this right will continue responsible for the expenses of working up to the 1st September following the date of denunciation of the Convention on this particular point. To take advantage of the said right, it must give notice to the other Contracting Parties at least six months before the said 1st September; so that, to be free from its obligations on September 1st, 1916, it must give notice on March 1st, 1916, at the latest, and similarly for each subsequent year.

In case the United States Government should not accept the proposal made to them, or in case one of the High Contracting Parties, for any reason, should not assume responsibility for the pecuniary contribution defined above, the High Contracting Parties shall settle the question in accordance with their mutual interests.

The Government of the High Contracting Party which undertakes the management of the service of derelict destruction is invited to devise means of granting, at the expense of this service, to merchant ships, which have contributed in an effective manner to the destruction of ocean derelicts, rewards to be fixed by the Government in accordance with the services rendered.

The High Contracting Parties which contribute to the cost of the three abovementioned services shall have the right by common consent to make from time to time such alterations in the provisions of this Article and of Article 6 as appear desirable.

Article 8.—The master of every ship which meets with dangerous ice or a dangerous derelict is bound to communicate the information by all the means of communication at his disposal to the ships in the vicinity, and also to the competent authorities at the first point of the coast with which he can communicate.

Every Administration which receives intelligence of dangerous ice or a dangerous derelict shall take all steps which it thinks necessary for bringing the information to the knowledge of those concerned and for communicating it to the other Administrations.

The transmission of messages respecting ice and derelicts is free of cost to the ships concerned.

It is desirable that the said information should be sent in a uniform manner. For this purpose a code, the use of which is optional, appears in Article I. of the Regulations annexed hereto.

Article 9.—The master of every ship fitted with a radiotelegraph installation, on becoming aware of the existence of an imminent and serious danger to navigation, shall report it immediately in the manner prescribed by Article II. of the Regulations annexed hereto.

Article 10.—When ice is reported on, or near, his course, the master of every ship is bound to proceed at night at a moderate speed, or to alter his course so as to go well clear of the danger zone.

Article 11.—The ships defined by Article 2 shall have on board a Morse signalling lamp of sufficient range.

The use of Morse signals is regulated by the Code appearing in Article III., as well as by Article IV. of the Regulations annexed hereto.

Article 12.—The use of the international distress signals for any other purpose than that of signals of distress is prohibited on every ship.

The use of private signals which are liable to be confused with the international distress signals is prohibited on every ship.

Article 13.—The selection of the routes across the North Atlantic in both directions is left to the responsibility of the steamship companies. Nevertheless the High Contracting Parties undertake to impose on these companies the obligation to give public notice of the regular routes which they propose their vessels should follow, and of any changes which they make in them.

The High Contracting Parties undertake, further, to use their influence to induce the

owners of all vessels crossing the Atlantic to follow as far as possible the routes adopted by the principal companies.

Article 14.—The High Contracting Parties undertake to use all diligence to obtain from the Governments which are not parties to this Convention their agreement to the revision of the International Regulations for Preventing Collisions at Sea as indicated below:—

(*A*) The Regulations shall be completed or revised in regard to the following points:

(1) The second white light.
(2) The stern light.
(3) A day signal for motor vessels.
(4) A sound signal for a vessel towed.
(5) The prohibition of signals similar to distress signals.

(*B*) Articles 2, 10, 14, 15, 31 of the said Regulations shall be amended in accordance with the following provisions:

Article 2. The second white mast-head light to be compulsory.

Article 10. A permanent fixed stern light to be compulsory.

Article 14. A special day signal to be compulsory for motor vessels.

Article 15. A special sound signal to be established for use by a vessel in tow, or if the tow is composed of several vessels, by the last vessel of the tow.

Article 31. Article 31 to be modified in the following manner: Add to the lists of both day and night signals the international radiotelegraph distress signal.

Article 15.—The Governments of the High Contracting Parties undertake to maintain, or, if it is necessary, to adopt, measures for the purpose of ensuring that from the point of view of safety of life at sea, the ships defined in Article 2 shall be sufficiently and efficiently manned.

Chapter IV., which contains Articles 16 to 30, refers to construction.

CHAPTER V.

Radiotelegraphy.

Article 31.—All merchant ships belonging to any of the Contracting States, whether they are propelled by machinery or by sails, and whether they carry passengers or not, shall, when engaged on the voyages specified in Article 2, be fitted with a radiotelegraph installation if they have on board fifty or more persons in all.

Advantage may not be taken of the provisions of Articles 2 and 3 of this Convention to exempt a ship from the requirements of this chapter.

Article 32.—Ships on which the number of persons on board is exceptionally and temporarily increased up to or beyond fifty as the result of *force majeure*, or because the master is under the necessity of increasing the number of his crew to fill the places of those who are ill, or is obliged to carry shipwrecked or other persons, are exempted from the above obligation.

Moreover, the Governments of each of the Contracting States, if they consider that the route and the conditions of the voyage are such as to render a radiotelegraph installation unreasonable or unnecessary, may exempt from the above requirement the following ships:—

(1) Ships which in the course of their voyage do not go more than 150 sea miles from the nearest coast.

(2) Ships on which the number of persons on board is exceptionally or temporarily increased up to or beyond fifty by the carriage of cargo hands or a part of the voyage, provided that the said ships are not going from one continent to another, and, that, during that part of their voyage, they remain within the limits of latitude 30° N. and 30° S.

(3) Sailing vessels of primitive build, such as *dhows*, *junks*, etc., if it is practically impossible to instal a radiotelegraph apparatus.

Article 33.—Ships which, in accordance with Article 31 above, are required to be fitted with a radiotelegraph installation are divided, for the purpose of radiotelegraph service, into three classes, in accordance with the classification established for ship stations in Article XIII. (*b*) of the Regulations annexed to the Radiotelegraph Convention, signed in London on July 5th, 1912, viz.:—

First Class.—Ships having a continuous service.

There shall be placed in the First Class ships which are intended to carry twenty-five or more passengers:—

(1) if they have an average speed in service of fifteen knots or more;

(2) if they have an average speed in service of more than thirteen knots, but only subject to the twofold condition that they have on board two hundred persons or more (passengers and crew), and that, in the course of their voyage, they go a distance of more than 500 sea miles between any two consecutive ports. Nevertheless these ships may be placed in the Second Class on condition that they have a continuous watch.

Second Class.—Ships having a service of limited duration.

There shall be placed in the Second Class all ships which are intended to carry twenty-five or more passengers, if they are not, for other reasons, placed in the First Class.

Ships placed in the Second Class must, during navigation, maintain a continuous watch for at least seven hours a day, and a watch of ten minutes at the beginning of every other hour.

Third Class.—Ships which have no fixed periods of service.

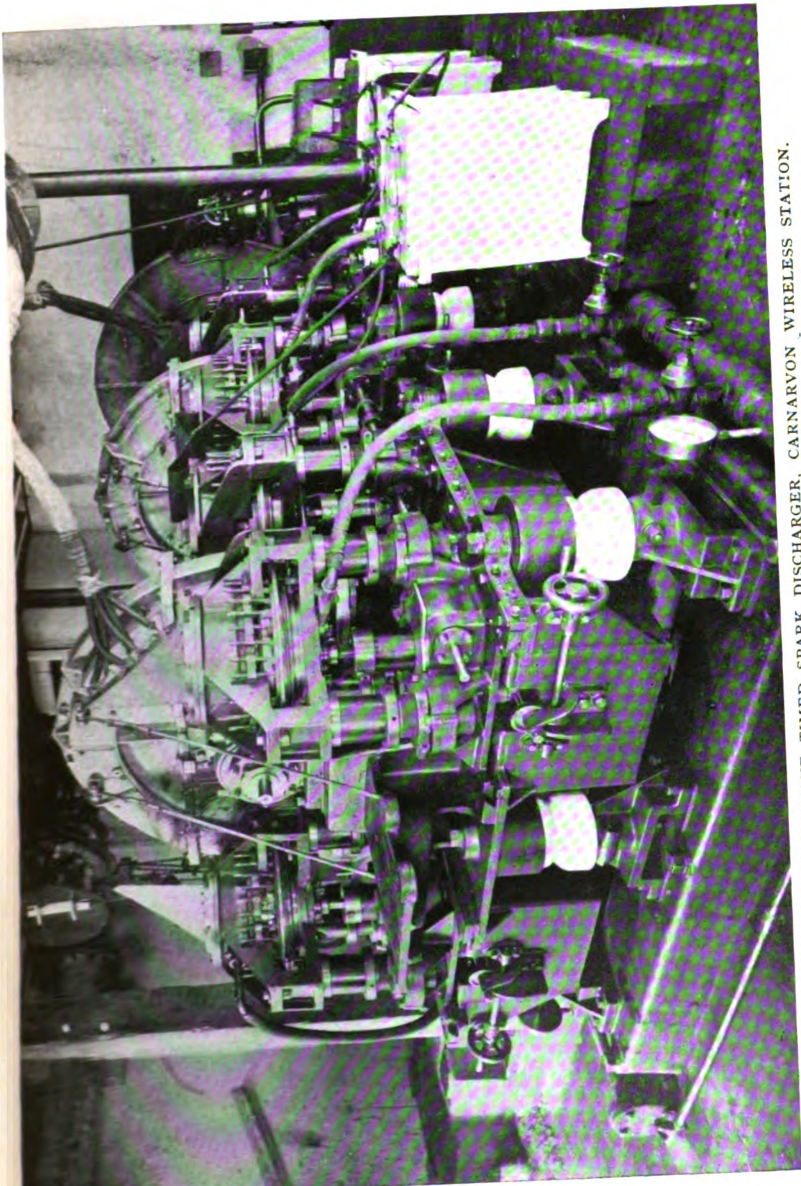
All ships which are placed neither in the First nor in the Second Class shall be placed in the Third Class.

The owner of a ship placed in the Second or in the Third Class has the right to require that, if the ship complies with all the requirements for a superior class, a statement to the effect that it belongs to that superior class shall be inserted in the Safety Certificate.

Article 34.—Ships which are required by Article 31 above to be fitted with a radiotelegraph installation shall be required, by the Governments of the countries to which they belong, to maintain a continuous watch during navigation as soon as the said Governments consider that it will be of service for the purpose of safety of life at sea.

Meanwhile, the High Contracting Parties undertake to require, from the date of the ratification of the present Convention, subject to the delays specified below, a continuous watch on the following ships:—

(1) Ships whose average speed in service exceeds thirteen knots, which have on board 200 persons or more, and which, in the course of their voyage, go a distance of more than 500 sea miles between two



MARCONI CONTINUOUS-WAVE TIMED SPARK DISCHARGER, CARNARVON WIRELESS STATION.

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consecutive ports, when these ships are placed in the Second Class.

(2) Ships in the Second Class, for the whole of the time during which they are more than 500 sea miles from the nearest coast.

(3) Other ships specified in Article 31, when they are engaged in the Trans-Atlantic trade, or when they are engaged in other trades if their route takes them more than 1,000 sea miles from the nearest coast.

Ships connected with all kinds of fishing business, including whaling, which are required to be fitted with a radiotelegraph installation, shall not be required to maintain a continuous watch.

The continuous watch may be kept by one or more operators, holding certificates in accordance with Article X. of the Regulations annexed to the International Radiotelegraph Convention, 1912, together, if necessary, with one or more certificated watchers. Nevertheless, if an efficient automatic calling apparatus is invented, the continuous watch may be maintained by this means by agreement between the Governments of the High Contracting Parties.

By "certificated watcher" is meant any person holding a certificate issued under the authority of the Administration concerned. To obtain this certificate, the applicant must prove that he is capable of receiving and understanding the radiotelegraph distress signal and the safety signal described in the Regulations annexed hereto.

The High Contracting Parties undertake to take steps to ensure that the certificated watchers observe the secrecy of correspondence.

Article 35.—The radiotelegraph installations required by Article 31 above shall be capable of transmitting clearly perceptible signals from ship to ship over a range of at least 100 sea miles by day under normal conditions and circumstances.

Every ship which is required, in conformity with the provisions of Article 31 above, to be fitted with a radiotelegraph installation, shall, whatever be the class in which it is placed, be provided in accordance with Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, with an emergency installation, every part of which is placed in a position of the greatest possible safety to be determined by the Government of the country to which the ship belongs.

In all cases the emergency installation must be placed, in its entirety, in the upper part of the ship, as high as practically possible.

The emergency installation includes, as provided by Article XI. of the Regulations annexed to the International Radiotelegraph Convention, 1912, an independent source of energy capable of being put into operation rapidly and of working for at least six hours with a minimum range of eighty sea miles for ships in the First Class and fifty sea miles for ships in the two other classes.

If the normal installation, which, in accordance with this Article, has a range of at least 100 sea miles, satisfies all the conditions prescribed above, an emergency installation is not required.

The licence provided for in Article IX. of the Regulations annexed to the International Radiotelegraph Convention, 1912, may not be issued unless the installation complies both with the provisions of that Convention and also with the provisions of this Convention.

Article 36.—The matters governed by the International Radiotelegraph Convention, 1912, and the Regulations annexed thereto, and in particular the radiotelegraph installations on ships, the transmission of messages, and the certificates of the operators, remain and will continue subject to the provisions:

(1) of that Convention and the Regulations annexed thereto, or of any other instruments which may in the future be substituted therefor;

(2) of this Convention, in regard to all the points in which it supplements the aforementioned documents.

Article 37.—Every master of a ship who receives a call for assistance from a vessel in distress is bound to proceed to the assistance of the persons in distress.

Every master of a vessel in distress has the right to requisition from among the ships which answer his call for assistance the ship or ships which he considers best able to render him assistance, but he must exercise this right only after consultation, so far as may be possible, with the masters of those ships. Such ships are then bound to comply immediately with the requisition by proceeding with all speed to the assistance of the persons in distress.

The masters of the ships which are required to render assistance are released from this obligation as soon as the master or masters requisitioned have made known that they will comply with the requisition, or as soon as the master of one of the ships which has reached the scene of the casualty has made known to them that their assistance is no longer necessary.

If the master of a ship is unable, or considers it unreasonable or unnecessary, in the special circumstances of the case, to go to the assistance of the vessel in distress, he must immediately inform the master of the vessel in distress accordingly. Moreover, he must enter in his log-book the reasons justifying his action.

The above provisions do not prejudice the International Convention for the unification of certain rules with respect to Assistance and Salvage at Sea, signed at Brussels on September 23rd, 1910, and, in particular, the obligation to render assistance laid down in Article II. of that Convention.

Article 38.—The High Contracting Parties undertake to take all steps necessary for giving effect to the provisions of this chapter with the least possible delay. Nevertheless, they may allow:

A delay not exceeding one year, from the date of the ratification of this Convention, for the provision and training of operators and for the installation of the apparatus on ships placed in the First and Second Classes.

A delay not exceeding two years, from the date of the ratification of this Convention, for the provision and training of the operators and watchers on the ships in the Third Class, for the installation of the apparatus on ships in the Third Class and for the establishment of a continuous watch on ships placed in the Second and Third Classes.

Chapter VI. refers to Life-saving Appliances and Fire Protection.

REGULATIONS.

SAFETY OF NAVIGATION.

ARTICLE I.

CODE FOR THE TRANSMISSION BY RADIOTELEGRAPHY OF INFORMATION RELATING TO ICE, DERELICTS, AND WEATHER.

INSTRUCTIONS.

Transmission of Information.—The transmission of information concerning ice and derelicts is obligatory. This information may be sent from ship to ship or to the Hydrographic Office, Washington, either in clear or by means of the abbreviations used in Part I. of this Code.

The transmission of information relating to weather is optional. Part II. of this Code may be used for this purpose, but may be modified at any time by the Meteorological Congress.

Information required :

PART I.—ICE AND DERELICTS.

1. The kind of ice or derelict observed.
2. The position of ice or derelict when last determined.

PART II.—METEOROLOGICAL INFORMATION.

1. The direction and force of the wind.
2. The set and velocity of the current.
3. Weather or state of the sky at a fixed hour.
4. Height of barometer and air temperature.
5. Barometric tendency and sea-surface temperature.

The time to be adopted :

In all radiotelegrams relating to ice or derelicts the time shall be given in Greenwich mean time.

The Address :

Reports, when sent to the Hydrographic Office, Washington, should be addressed " Hydrographic " ; reports to the Meteorological Office, London, should be addressed " Meteorology."

The Message :

1. When sending information about ice or derelicts alone, two groups of five figures each are used, preceded by the word " ice " ; these groups may be repeated as often as necessary.

2. If meteorological information is to be sent in addition, a further four groups of five figures each are used, preceded by the word " weather." These groups are inserted at the end of the message after all the information relating to ice has been given.

N.B.—If the message contains the word " weather," all the code groups before that word give information relating to ice, and those after the word " weather " give meteorological information. If there is no word " weather " in the message, it only contains information about ice. (See examples of the two kinds of message given in this Article.)

PART I.

ICE AND DERELICTS.

Information respecting ice and derelicts is given by means of ten figures divided into two groups of five figures each. These groups are preceded by the word " ice."

Two figures	The day of the month (*dd*), according to Code I.
One figure	The time of observation (*T*), according to Code II.
One figure	The kind of ice observed (*I*), according to Code III.
Three figures	The latitude of the ice observed (*p p p*), to tenths of a degree (see table below).
Three figures	The longitude of the ice observed (*p' p' p'*), to tenths of a degree (see table below).

The first group consists of *ddTIp*.

The second group consists of *ppp'p'p'*.

Codes.

Code I.—*Day of the Month.*

The day of the month is given by two figures, of which the first may be zero: 01 to 31.

Code II.—*Time of Observation.*

The time of observation is included between—	Code No.
1 a.m. and 4 a.m. Greenwich Mean Time	1
4 a.m. and 7 a.m.	2
7 a.m. and 10 a.m.	3
10 a.m. and 1 p.m.	4
1 p.m. and 4 p.m.	5
4 p.m. and 7 p.m.	6
7 p.m. and 10 p.m.	7
10 p.m. and 1 a.m.	8

Code III.—*Nature of Ice or Derelict Observed.*

0. No ice observed.
1. Single iceberg. Huge mass of floating ice.
2. Several icebergs.
3. Numerous icebergs.
4. Floeberg. Thick piece of salt-water ice like a small iceberg.
5. Field ice. Ice extending as far as the eye can reach, but through which it is possible to navigate.
6. Pack ice. Pieces of ice broken from berg or floe, partly closed together.
7. Land ice. Ice attached to the shore since the winter.
8. Derelict.
9. (Not allotted.)

Example.

Message sent from Ship to Ship.

—	First Message.	Coded as	Second Message.	Coded as	Third Message.	Coded as	Fourth Message.	Coded as
Date of observation	15	15	15	15	15	15	16	16
Time of observation	10 a.m.–1 p.m.	4	4 p.m.–7 p.m.	6	7 p.m.–10 p.m.	7	4 p.m.–7 a.m.	2
Nature of ice or derelict	Field	5	Numerous icebergs	3	Derelict	8	Single iceberg	1
Position of ice or derelict	Latitude 45° 42′	457	Latitude 46° 5′	461	Latitude 46° 25′	464	Latitude 47° 19′	473
	Longitude 46° 11′	462	Longitude 44° 40′	447	Longitude 43° 58′	440	Longitude 40° 15′	402

The code of the above message would thus be:

S.S. to S.S.

Ice, 15454, 57462: 15634, 61447: 15784, 64440: 16214, 73402.

PART II.

Meteorological Information.

Information respecting weather, etc., is given by four groups of five figures each. These groups are preceded by the word "weather."

First Group (DDPPP);

The day of the month: two figures (*DD*), according to Code I.

The position of the ship when transmitting the message, indicated by three figures (*PPP*), representing the 1° square in which the ship is situated, according to Code IV. and the numbered chart annexed to this Article.

Second Group (WWCCX);

Wind direction and force at 8 a.m. at the 75th meridian of west longitude: two figures (*WW*), according to Code V.

Set and velocity of current: two figures (*CC*), according to Code VI.

Weather or state of the sky at the same hour: one figure (*X*), according to Code VII.

Third Group (*BBBAA*) ;

The barometric height to tenths of a millimetre at 8 a.m. at the 75th meridian of west longitude : three figures (*BBB*), according to Code VIII.

Air temperature at the same hour : two figures (*AA*), according to Code IX.

Fourth Group (*bbSSS*) ;

Barometric tendency at 8 a.m. at the 75th meridian of west longitude : two figures (*bb*), according to Code X.

Sea surface temperature at the same hour : three figures (*SSS*), according to Code XI.

Codes.

Code IV.—*Position of Ship.*

A chart gives the numbers to be assigned to each 1° square in the North Atlantic. The position of the ship, when the meteorological data given in Part II. were observed, is indicated by the three figures representing the 1° square in which the ship is situated. For example : A position 51° 55′ N., 26° 49′ W. would be reported as 561.

Code V.

Wind Direction (to 16 points) and *Wind Force* at 8 a.m. mean time at the 75th meridian of west longitude (*WW*).

—	Wind Force, Beaufort Scale.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	N.
Calm	0	00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Light Breeze ...	1, 2, or 3	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
Moderate breeze	4 or 5	02	08	14	20	26	32	38	44	50	56	62	68	74	80	86	92
Strong wind ...	6 or 7	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
Gale Force ...	8 or 9	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
Storm Force ...	10 or 11	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
Hurricane ...	12	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96

N.B.—The wind direction is to be referred to true bearin s

Code VI.

Direction (to 16 points) and *Velocity of the Current* (*CC*).

Nautical Miles per hour.	N.N.E.	N.E.	E.N.E.	E.	E.S.E.	S.E.	S.S.E.	S.	S.S.W.	S.W.	W.S.W.	W.	W.N.W.	N.W.	N.N.W.	N.
0·25	01	07	13	19	25	31	37	43	49	55	61	67	73	79	85	91
0·5	02	09	14	20	26	32	38	44	50	56	62	68	74	80	86	92
1	03	09	15	21	27	33	39	45	51	57	63	69	75	81	87	93
2	04	10	16	22	28	34	40	46	52	58	64	70	76	82	88	94
3	05	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95
4	06	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
	00	No current.														
	99	No observation.														

N.B.—The current is to be referred to true bearings

Code VII.

The State of the Sky at 8 a.m. mean time at the 75th meridian of west longitude :

0. Sky quite clear.
1. Sky quarter clouded.
2. Sky half clouded.
3. Sky three-quarters clouded.
4. Sky entirely overcast.
5. Rain falling.

6. Snow or hail falling.
7. Haze or mist.
8. Fog.
9. Thunderstorm.

Code VIII.—*Height of Barometer.*

The reading of the mercury barometer is to be corrected for index error, and reduced to O° C. and sea level. A table of corrections is given below.

The corrected reading is coded by omitting the first figure of the barometer reading in tenths of a millimetre: for example, 761·2 mm. is coded 612.

A table for converting hundredths of an inch to tenths of a millimetre is given below.

Code IX.

Air Temperature is coded in two figures according to the following table:—

Degrees Centigrade.	Degrees Fahrenheit.	Code No.	Degrees Centigrade.	Degrees Fahrenheit.	Code No.
—15·0	5·0	00	10·0	50·0	50
—14·5	5·9	01	10·5	50·9	51
—14·0	6·8	02	11·0	51·8	52
—13·5	7·7	03	11·5	52·7	53
—13·0	8·6	04	12·0	53·6	54
—12·5	9·5	05	12·5	54·5	55
—12·0	10·4	06	13·0	55·4	56
—11·5	11·3	07	13·5	56·3	57
—11·0	12·2	08	14·0	57·2	58
—10·5	13·1	09	14·5	58·1	59
—10·0	14·0	10	15·0	59·0	60
— 9·5	14·9	11	15·5	59·9	61
— 9·0	15·8	12	16·0	60·8	62
— 8·5	16·7	13	16·5	61·7	63
— 8·0	17·6	14	17·0	62·6	64
— 7·5	18·5	15	17·5	63·5	65
— 7·0	19·4	16	18·0	64·4	66
— 6·5	20·3	17	18·5	65·3	67
— 6·0	21·2	18	19·0	66·2	68
— 5·5	22·1	19	19·5	67·1	69
— 5·0	23·0	20	20·0	68·0	70
— 4·5	23·9	21	20·5	68·9	71
— 4·0	24·8	22	21·0	69·8	72
— 3·5	25·7	23	21·5	70·7	73
— 3·0	26·6	24	22·0	71·6	74
— 2·5	27·5	25	22·5	72·5	75
— 2·0	28·4	26	23·0	73·4	76
— 1·5	29·3	27	23·5	74·3	77
— 1·0	30·2	28	24·0	75·2	78
— 0·5	31·1	29	24·5	76·1	79
0·0	32·0	30	25·0	77·0	80
0·5	32·9	31	25·5	77·9	81
1·0	33·8	32	26·0	78·8	82
1·5	34·7	33	26·5	79·7	83
2·0	35·6	34	27·0	80·6	84
2·5	36·5	35	27·5	81·5	85
3·0	37·4	36	28·0	82·4	86
3·5	38·3	37	28·5	83·3	87
4·0	39·2	38	29·0	84·2	88
4·5	40·1	39	29·5	85·1	89
5·0	41·0	40	30·0	86·0	90
5·5	41·9	41	30·5	86·9	91
6·0	42·8	42	31·0	87·8	92
6·5	43·7	43	31·5	88·7	93
7·0	44·6	44	32·0	89·6	94
7·5	45·5	45	32·5	90·5	95
8·0	46·4	46	33·0	91·4	96
8·5	47·3	47	33·5	92·3	97
9·0	48·2	48	34·0	93·2	98
9·5	49·1	49	34·5	94·1	99

Code X.—*Barometric Tendency.*

By the "barometric tendency at a given hour" is meant the amount by which the barometric height has changed during the preceding three

hours. It is to be expressed in millimetres. For example, the barometric tendency at 8 a.m. could be obtained by comparing the reading taken at that hour, say 755·7 mm., with a reading taken at 5 a.m., say 759·3 mm. In this case the barometric tendency would be expressed by a fall of 3·6 millimetres. As a general rule the barometric tendency is to be determined from the trace of the barograph.

The barometric tendency is coded in two figures, according to the following table :—

Rise in Barometer.		Code No.	Fall in Barometer.		Code No.
Millimetres.	Inches.		Millimetres.	Inches.	
0·0— 0·4	0·00—0·01	01	0·0— 0·4	0·00—0·01	51
0·5— 0·9	0·02—0·03	02	0·5— 0·9	0·02—0·03	52
1·0— 1·4	0·04—0·05	03	1·0— 1·4	0·04—0·05	53
1·5— 1·9	0·06—0·07	04	1·5— 1·9	0·06—0·07	54
2·0— 2·4	0·08—0·09	05	2·0— 2·4	0·08—0·09	55
2·5— 2·9	0·10—0·11	06	2·5— 2·9	0·10—0·11	56
3·0— 3·4	0·12—0·13	07	3·0— 3·4	0·12—0·13	57
3·5— 3·9	0·14—0·15	08	3·5— 3·9	0·14—0·15	58
4·0— 4·4	0·16—0·17	09	4·0— 4·4	0·16—0·17	59
4·5— 4·9	0·18—0·19	10	4·5— 4·9	0·18—0·19	60
5·0— 5·4	0·20—0·21	11	5·0— 5·4	0·20—0·21	61
5·5— 5·9	0·22—0·23	12	5·5— 5·9	0·22—0·23	62
6·0— 6·4	0·24—0·25	13	6·0— 6·4	0·24—0·25	63
6·5— 6·9	0·26—0·27	14	6·5— 6·9	0·26—0·27	64
7·0— 7·4	0·28—0·29	15	7·0— 7·4	0·28—0·29	65
7·5— 7·9	0·30—0·31	16	7·5— 7·9	0·30—0·31	66
8·0— 8·4	0·32—0·33	17	8·0— 8·4	0·32—0·33	67
8·5— 8·9	0·34—0·35	18	8·5— 8·9	0·34—0·35	68
9·0— 9·4	0·36—0·37	19	9·0— 9·4	0·36—0·37	69
9·5— 9·9	0·38—0·38	20	9·5— 9·9	0·38—0·38	70
10·0—10·4	0·39—0·40	21	10·0—10·4	0·39—0·40	71
10·5—10·9	0·41—0·42	22	10·5—10·9	0·41—0·42	72
11·0—11·4	0·43—0·44	23	11·0—11·4	0·43—0·44	73
11·5—11·9	0·45—0·46	24	11·5—11·9	0·45—0·46	74
12·0—12·4	0·47—0·48	25	12·0—12·4	0·47—0·48	75
12·5—12·9	0·49—0·50	26	12·5—12·9	0·49—0·50	76
13·0—13·4	0·51—0·52	27	13·0—13·4	0·51—0·52	77
13·5—13·9	0·53—0·54	28	13·5—13·9	0·53—0·54	78
14·0—14·4	0·55—0·56	29	14·0—14·4	0·55—0·56	79
14·5—14·9	0·57—0·58	30	14·5—14·9	0·57—0·58	80
15·0—15·4	0·59—0·60	31	15·0—15·4	0·59—0·60	81
15·5—15·9	0·61—0·62	32	15·5—15·9	0·61—0·62	82
16·0—16·4	0·63—0·64	33	16·0—16·4	0·63—0·64	83
16·5—16·9	0·65—0·66	34	16·5—16·9	0·65—0·66	84
17·0—17·4	0·67—0·68	35	17·0—17·4	0·67—0·68	85
17·5—17·9	0·69—0·70	36	17·5—17·9	0·69—0·70	86
18·0—18·4	0·71—0·72	37	18·0—18·4	0·71—0·72	87
18·5—18·9	0·73—0·74	38	18·5—18·9	0·73—0·74	88
19·0—19·4	0·75—0·76	39	19·0—19·4	0·75—0·76	89
19·5—19·9	0·77—0·78	40	19·5—19·9	0·77—0·78	90
20·0—20·4	0·79—0·80	41	20·0—20·4	0·79—0·80	91
20·5—20·9	0·81—0·82	42	20·5—20·9	0·81—0·82	92
21·0—21·4	0·83—0·84	43	21·0—21·4	0·83—0·84	93
21·5—21·9	0·85—0·86	44	21·5—21·9	0·85—0·86	94
22·0—22·4	0·87—0·88	45	22·0—22·4	0·87—0·88	95
22·5—22·9	0·89—0·90	46	22·5—22·9	0·89—0·90	96
23·0—23·4	0·91—0·92	47	23·0—23·4	0·91—0·92	97
23·5—23·9	0·93—0·94	48	23·5—23·9	0·93—0·94	98
24·0—24·4	0·95—0·96	49	The barometric tendency cannot be reported.		99

Code XI.—*Sea Surface Temperature.*

Sea surface temperature to tenths of a degree Centigrade is coded by three figures, or, when necessary, by two figures preceded by zero. If the temperature is negative, the first of these three figures is 5.

For example : — 2·2° C. is coded as 522.
+ 1·0° C. ,, 010.
+15·6° C. ,, 156.

TABLE OF CORRECTIONS FOR REDUCING BAROMETRIC HEIGHTS TO 0° C. AND TO SEA LEVEL.

NOTE.—The barometric reading should first be corrected for index error. This error may be neglected if it is less than 0·3 mm. The + sign indicates that the correction is to be *added* to the barometric reading. The — sign indicates that the correction is to be *subtracted*.

Temperature by the thermometer attached to the barometer			—4° C. 24·8° F.	—2° C. 28·4° F.	0° C. 32° F.	+2° C. 35·6° F.	4° C. 39·2° F.	6° C. 42·8° F.	8° C. 46·4° F.	10° C. 50° F.	12° C. 53·6° F.	14° C. 57·2° F.	16° C. 60·8° F.	18° C. 64·4° F.	20° C. 68° F.	22° C. 71·6° F.	24° C. 75·2° F.	26° C. 78·8° F.	28° C. 82·4° F.
Height of barometer cistern above sea level.			*Corrections to be made.*																
M'tres.	Ft.	In.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
0	0	0	+0·5	+0·3	0·0	—0·2	—0·5	—0·7	—1·0	—1·2	—1·5	—1·7	—2·0	—2·2	—2·5	—2·7	—3·0	—3·2	—3·5
1	3	3	+0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1	3·4
2	6	7	+0·8	0·5	0·3	0·0	0·3	0·5	0·7	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0	3·2
3	9	10	+0·9	0·6	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·6	2·9	3·1
4	13	1	+1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·2	1·5	1·7	2·0	2·2	2·5	2·8	3·0
5	16	5	+1·2	0·9	0·7	0·4	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·1	2·4	2·7	2·9
6	19	8	+1·3	1·0	0·8	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·0	2·3	2·6	2·8
7	22	0	+1·4	1·2	0·9	0·6	0·3	+0·1	0·1	0·4	0·6	0·9	1·1	1·4	1·6	1·9	2·2	2·4	2·7
8	26	3	+1·5	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·8	2·1	2·3	2·6
9	29	6	+1·7	1·4	1·2	0·8	0·6	0·3	+0·1	0·2	0·4	0·6	0·9	1·1	1·4	1·6	2·0	2·2	2·5
10	32	10	+1·8	1·6	1·3	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·0	1·3	1·5	1·9	2·1	2·4
11	36	1	+1·9	1·7	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·4	1·8	2·0	2·2
12	39	4	+2·0	1·8	1·5	1·2	1·0	0·7	0·5	0·2	0·0	0·3	0·5	0·8	1·1	1·3	1·6	1·9	2·1
13	42	8	+2·2	1·9	1·7	1·3	1·1	0·8	0·6	0·3	+0·1	0·2	0·4	0·7	0·9	1·2	1·5	1·8	2·0
14	45	11	+2·3	2·0	1·8	1·5	1·2	0·9	0·7	0·4	0·2	0·0	0·3	0·6	0·8	1·1	1·4	1·6	1·9
15	49	3	+2·4	2·2	1·9	1·6	1·4	1·1	0·8	0·6	0·3	+0·1	0·2	0·5	0·7	1·0	1·3	1·5	1·8
16	52	6	+2·5	2·3	2·0	1·7	1·5	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4	1·6
17	55	9	+2·6	2·4	2·1	1·9	1·6	1·3	1·1	0·8	0·6	0·3	+0·1	0·3	0·5	0·8	1·0	1·3	1·5
18	59	1	+2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	0·2	0·1	0·4	0·6	0·9	1·2	1·4
19	62	4	+2·9	2·6	2·4	2·1	1·9	1·5	1·3	1·0	0·8	0·6	0·3	0·0	0·3	0·5	0·8	1·0	1·3
20	65	7	+3·0	2·8	2·5	2·3	2·0	1·7	1·4	1·2	0·9	0·7	0·4	+0·1	0·2	0·4	0·7	0·9	1·2
21	68	11	+3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·5	0·2	0·1	0·3	0·6	0·8	1·1
22	72	2	+3·3	3·0	2·8	2·5	2·2	1·9	1·7	1·4	1·2	0·9	0·6	0·3	+0·1	0·2	0·4	0·7	0·9
23	75	6	+3·4	3·1	2·9	2·6	2·4	2·1	1·8	1·5	1·3	1·0	0·8	0·4	0·2	0·1	0·3	0·6	0·8

Table for Converting Barometric Readings in Inches into Millimetres.

Inches and Tenths.	Hundredths of an Inch.									
	0	1	2	3	4	5	6	7	8	9
	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.	Mm.
27·0	685·8	686·0	686·3	686·6	686·8	687·1	687·3	687·6	687·8	688·1
·1	688·3	688·6	688·8	689·1	689·3	689·6	689·9	690·1	690·4	690·6
·2	690·9	691·1	691·4	691·6	691·9	692·1	692·4	692·7	692·9	693·2
·3	693·4	693·7	693·9	694·2	694·4	694·7	694·9	695·2	695·4	695·7
·4	696·0	696·2	696·5	696·7	697·0	697·2	697·5	697·7	697·9	698·2
·5	698·5	698·7	699·0	699·3	699·5	699·8	700·1	700·3	700·5	700·8
·6	701·0	701·3	701·5	701·8	702·0	702·3	702·6	702·8	703·1	703·3
·7	703·6	703·8	704·1	704·3	704·6	704·8	705·1	705·4	705·6	705·9
·8	706·1	706·4	706·6	706·9	707·1	707·4	707·6	707·9	708·1	708·4
·9	708·7	708·9	709·2	709·4	709·7	709·9	710·2	710·4	710·7	710·9
28·0	711·2	711·4	711·7	712·0	712·2	712·5	712·7	713·0	713·2	713·5
·1	713·7	714·0	714·2	714·5	714·7	715·0	715·3	715·5	715·8	716·0
·2	716·3	716·5	716·8	717·1	717·3	717·5	717·8	718·0	718·3	718·6
·3	718·8	719·1	719·3	719·6	719·8	720·1	720·3	720·6	720·8	721·1
·4	721·4	721·6	721·9	722·1	722·4	722·6	722·9	723·1	723·4	723·6
·5	723·9	724·1	724·4	724·7	724·9	725·2	725·4	725·7	725·9	726·2
·6	726·4	726·7	726·9	727·2	727·4	727·7	728·0	728·2	728·5	728·7
·7	729·0	729·2	729·5	729·7	729·9	730·2	730·5	730·7	731·0	731·3
·8	731·5	731·8	732·0	732·3	732·5	732·8	733·0	733·3	733·5	733·8
·9	734·1	734·3	734·6	734·8	735·1	735·3	735·6	735·8	736·1	736·3
29·0	736·6	736·8	737·1	737·4	737·6	737·9	738·1	738·4	738·6	738·9
·1	739·1	739·4	739·6	739·9	740·1	740·4	740·7	740·9	741·2	741·4
·2	741·7	741·9	742·2	742·4	742·7	742·9	743·2	743·4	743·7	744·0
·3	744·2	744·5	744·7	745·0	745·2	745·5	745·7	745·9	746·2	746·5
·4	746·8	747·0	747·3	747·5	747·7	748·1	748·3	748·5	748·8	749·0
·5	749·3	749·5	749·8	750·1	750·3	750·6	750·8	751·1	751·3	751·6
·6	751·8	752·1	752·3	752·6	752·8	753·1	753·4	753·6	753·9	754·1
·7	754·4	754·6	754·8	755·1	755·4	755·6	755·9	756·1	756·4	756·7
·8	756·9	757·2	757·4	757·7	757·9	758·2	758·4	758·7	758·9	759·2
·9	759·5	759·7	760·0	760·2	760·5	760·7	761·0	761·2	761·5	761·7
30·0	762·0	762·2	762·5	762·8	763·0	763·3	763·5	763·8	764·0	764·3
·1	764·5	764·8	765·0	765·3	765·5	765·8	766·1	766·3	766·6	766·8
·2	767·1	767·3	767·6	767·8	768·1	768·3	768·6	768·8	769·1	769·4
·3	769·6	769·9	770·1	770·4	770·6	770·9	771·1	771·4	771·6	771·9
·4	772·2	772·4	772·7	772·9	773·2	773·4	773·7	773·9	774·2	774·4
·5	774·7	774·9	775·2	775·5	775·7	776·0	776·2	776·5	776·7	777·0
·6	777·2	777·5	777·7	778·0	778·2	778·5	778·8	779·0	779·3	779·5
·7	779·8	780·0	780·3	780·5	780·8	781·0	781·3	781·5	781·8	782·1
·8	782·3	782·6	782·8	783·1	783·3	783·6	783·8	784·1	784·3	784·6
·9	784·9	785·1	785·4	785·6	785·9	786·2	786·4	786·6	786·9	787·1
31·0	787·4	787·6	787·9	788·2	788·4	788·7	788·9	789·2	789·4	789·7
·1	789·9	790·2	790·4	790·7	790·9	791·2	791·5	791·7	792·0	792·2
·2	792·5	772·7	793·0	793·2	793·5	793·7	794·0	794·2	794·5	794·8
·3	795·1	795·3	795·5	795·8	796·0	796·3	796·5	796·8	797·0	797·3
·4	797·6	797·8	798·1	798·3	798·6	798·8	799·1	799·3	799·6	799·8

Table for converting Minutes to tenths of a Degree.

Minutes.	Tenths of a degree.	Minutes.	Tenths of a degree.
0–3	0	34–39	6
4–9	1	40–45	7
10–15	2	46–51	8
16–21	3	52–57	9
22–27	4	58–59	10
28–33	5		

EXAMPLE.

Message containing Meteorological Information.

Ice:

—	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Time of observation	1 p.m.—4 p.m.	5	4 a.m.—7 a.m.	2
Nature of ice or derelict	Single iceberg	1	Field ice	5
Position of ice or derelict ...	Latitude 44° 35′ Longitude 43° 15′	446 432	Latitude 42° 58′ Longitude 47° 3′	430 470

Weather:

—	First Message.	Coded as	Second Message.	Coded as
Date of observation	21	21	22	22
Position of ship	Latitude 45° 13′ Longitude 42° 5′	825	Latitude 43° 47′ Longitude 46° 33′	863
Direction and force of wind	E.S.E. 5	26	S.W. 2	55
Set and velocity of current	N.W. 2 m-h	82	S.S.E. 1 m-h.	39
Weather	Sky clear	0	Fog	8
Barometer	765·3 mm.	653	753·2 mm.	532
Air temperature	15·3° C.	61	9·8° C.	50
Barometric tendency	Rise ·8	02	Fall 2·7	56
Sea-surface temperature	1·4° C.	014	— ·7° C.	507

The Code of the above message sent to the Meteorological Office would thus be:

Meteorology: Ice 21514, 46432: 22254, 30470: Weather 21825, 26820 65361, 02014: 22863, 55398, 53250, 56507.

ARTICLE II.

SAFETY SIGNAL.

The radiotelegraph stations which have to transmit to ships information involving safety of navigation and being of an urgent character (icebergs, derelicts, cyclones, typhoons, sudden changes in the position or form of fixed obstructions or of land marks) shall make use of the following signal, called the safety signal, repeated at short intervals ten times at full power:

— — — (T T T)

In principle, all radiotelegraph stations receiving the safety signal shall, if the transmission of messages by them would interfere with the receipt by any other station of the safety signal and the following safety message, keep silence, in order to allow all interested stations to receive that message. This does not apply to cases of distress.

The safety message shall be transmitted one minute after the safety signal has been sent out, and shall be repeated thereafter three times at intervals of ten minutes.

The Governments of the Contracting States will select the stations which are to send out to mariners safety information of an urgent character.

When the information in question has been sent out by stations performing the time service, it shall be again sent out after the transmission of the time signal and the weather report.

ARTICLE III.

MORSE CODE.

INTERNATIONAL SIGNALS.

These signals may be made at night or in thick weather, either by long and short flashes of light, or by long and short sound signals (whistles, fog-horns, etc.), or during the day by hand flags.

1.—URGENT AND IMPORTANT SIGNALS.

You are standing into danger...	• • —
I want assistance; remain by me	• • • —
Have encountered ice	• — —
Your lights are out (*or*, burning badly) ...	• — — •
The way is off my ship; you may feel your way past me	• — •
Stop (*or*, heave to); I have something important to communicate	• — • •
Am disabled; communicate with me ...	• • — •

2.—GENERAL SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.	How Answered.
Preparative ..	• • • • • • • • • &c.	A succession of E's in one group	By the general answer T.
Answer	—	T (singly)	
Spelling	• • — • • • — •	F F in one group	By the general answer T.
Use International Code of Signals	— — — — — —	M M M in one group	By the general answer T.
International Code Flag sign ..	— — — —	M M in one group	
Break sign	• • • •	I I as separate letters	
Stop..	• • • • • •	I I I as separate letters	
Finish of the message	• • • — •	V E as one group	• — • R. — • • D. As separate letters.
Erase sign	• • • • &c.	A succession of E's as separate letters	By a succession of E's as separate letters.
Annul	W W • — — • — —	W W as one group	By W W as one group.
Repeat word after: (when a single word is required)	I M I • • — — • • W A • — — • — Followed by the word preceding the one required	I M I as one group W A as separate letters	By the general answer T.
Repeat all after: (if more than one word is required)	I M I • • — — • • A A • — • —	I M I as one group A A as separate letters	By the general answer T.
Repeat all: (if the whole message is to be repeated)	I M I • • — — • • A L L • — • — • • • — • •	I M I as one group A L L as separate letters	By the general answer T.

3.—NATIONALITY SIGNALS.

Meaning.	Signal.	Equivalent Letters and How Made.
American	▬ ● ▬ ● ▬ ● ●	C D as separate letters.
Argentine	▬ ● ▬ ● ▬ ▬ ●	C G " "
Austro-Hungarian ..	▬ ● ▬ ● ● ● ▬ ●	C F " "
Belgian	▬ ● ● ▬ ● ▬ ●	D C " "
Brazilian	▬ ● ● ●	D E " "
British	● ● ▬ ●	F.
Bulgarian	▬ ● ● ● ● ▬ ●	D F as separate letters.
Chilian	▬ ● ● ▬ ▬ ●	D G " "
Chinese	● ▬ ● ▬ ●	E C " "
Colombian	● ▬ ● ●	E D " "
Danish	● ● ● ▬ ●	E F " "
Dutch	● ▬ ▬ ●	E G " "
French	●	E.
German	▬ ▬ ●	G.
Greek	▬ ▬ ▬ ▬ ▬ ● ●	M M in one group followed by D.
Italian	▬ ● ▬ ● ●	C E as separate letters.
Japanese	▬ ● ▬ ●	C.
Mexican	● ● ▬ ● ▬ ● ▬ ●	F C as separate letters.
Norwegian	▬ ▬ ▬ ▬ ▬ ● ▬ ●	M M in one group followed by C.
Peruvian	● ● ▬ ● ▬ ● ●	F D as separate letters.
Portuguese	● ● ▬ ● ●	F E " "
Russian	▬ ● ●	D.
Siamese	● ● ▬ ● ▬ ▬ ●	F G as separate letters.
Spanish	▬ ▬ ● ▬ ● ▬ ●	G C " "
Swedish	▬ ▬ ▬ ▬ ●	M M in one group followed by E.
Turkish	▬ ▬ ● ▬ ● ●	G D as separate letters.
Uruguayan	▬ ▬ ● ●	G E " "
Venezuelan	▬ ▬ ● ● ● ▬ ●	G F " "

4.—INSTRUCTIONS.

1. THE URGENT AND IMPORTANT SIGNALS may be made without the Preparative Signal being answered if it is supposed that the person addressed cannot reply, or in other special circumstances; but in this case a pause should be made between the Preparative Signal and the message.

2. THE SIGNAL ● ● ▬ ● ● ● ▬ ● (FF) is used previous to any letters which are intended to spell words.

3. THE SIGNAL ▬ ▬ ▬ ▬ ▬ ▬ (MMM) is used previous to any message sent by means of the International Code of Signals.

4. THE SIGNAL ▬ ▬ ▬ ▬ (MM) means the Code Flag of the International Code of Signals, and is used as indicated in the Code Book.

5. THE BREAK SIGN is used between the address of the receiver and the text of the message, and after the message if the name of the sender is to be signalled.

6. THE STOP is used, where necessary, in the text of the signal.

7. THE ERASE is used to cancel the last word or signal group, sent by mistake.

8. THE ANNUL is used to cancel *all* the message.

9. METHOD OF ANSWERING. Each word or signal group, when understood, is to be answered by one long flash ▬ (T).

If a word or signal group is not answered, the sender is to repeat it until answered by a long flash.

At the end of the message, if understood, the receiver will make ● ▬ ● ▬ ● ● (RD).

The Erase and Annul signs are to be answered by their own signs.

10. THE NATIONALITY SIGNAL is made immediately after the answer to the Preparatory Signal has been received, to indicate the nationality of the vessel making the signal. It is answered by the nationality signal of the vessel receiving the message.

SAFETY CERTIFICATE.

Radiotelegraph installation :—

—	Class and numbers required by Articles 33 and 34 of the said Convention.	Actual class and numbers.
Class of ship :—	...	...
Number of { Operators of the 1st Class ...	...	...
Number of { " " 2nd " ...	...	...
Number of { Certificated Watchers ...	—	...

III. That in all other respects the ship complies with the requirements of the said Convention so far as those requirements apply thereto.

This certificate is issued under the authority of the Government. It will remain in force until

The undersigned declares that he is duly authorised by the said Government to issue this certificate.

(Signature)

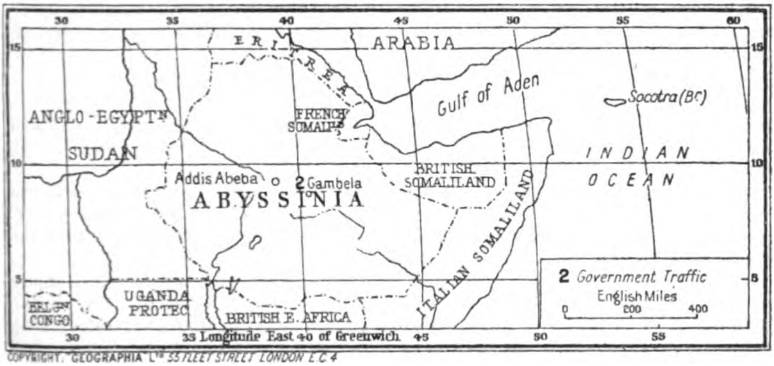
Issued at the day of

WIRELESS LAWS AND REGULATIONS

THE VARIOUS ACTS, DECREES, REGULATIONS, ETC., REFERRED TO IN THE FOLLOWING LAWS ARE ENUMERATED AT THE BEGINNING OF EACH COUNTRY'S LAWS AND DISTINGUISHED BY CAPITAL LETTERS OF THE ALPHABET.

ABYSSINIA

THIS historically famous country, more commonly known to the ancients as Ethiopia, is an empire, at present under the rule of Waizeru Zauditu. The people profess a primitive form of Christianity, but are illiterate, and the admission of Abyssinia to the Postal Union is probably due to the fact that the posts and telegraphs are under French administration.



There are no wireless stations working in the " Empire " under independent native rule, but a radiotelegraphic station is maintained at Gambela, in the enclave of Kassala. This was constructed, and is worked, by the Sudan Government. *For Regulations, see under " Sudan."*

ADEN

(See BRITISH SOMALILAND.)

ADMIRALTY ISLAND
(MANUS)

(See map on p. 129.)

ALASKA

(See UNITED STATES OF AMERICA.)

ALGERIA

(See FRANCE.)

ANGOLA

(See PORTUGAL.)

ANNAM

(See map on p. 211.)

ANTIGUA

(See LEEWARD ISLANDS.)

ARGENTINA

SITUATED, so far as latitude is concerned, between 20° 50′ and 55° 19′ south, and possessing a longitude stretching from 53° 41′ to 70° 56′ west of Greenwich, Argentina is the second in size of the republics of South America.

The country was first visited by Spanish explorers in 1516, and remained a colony of Spain until 1810, when the natives commenced their struggle for independence, which was solemnly proclaimed by the Congress assembled at Tucuman in 1816.

This was followed by a long period of civil war until 1853, when a National Constitution was elaborated, with modifications introduced in 1860, 1866, and 1898. Great Britain definitely recognised Argentine independence in 1825. The system of government adopted is that of a Federal Republic composed of three powers—the Executive, the Legislative, and the Judicial. The Executive power is exercised by the President of the Republic, who remains in office for a period of six years, assisted by eight Minister-Secretaries. The Legislative power is exercised by a National Congress composed of two Chambers, the Senate and the Chamber of Deputies.

The total area of the fourteen autonomous provinces and ten national governments which go to make up Argentina comprises in all about 1,132,000 square miles. The capital city is Buenos Aires, situated on the Rio de la Plata. The census of 1914 gave the total population of the country as comprising 7,905,502 persons.

CONTROL.

The Radiotelegraphic Law, passed in October, 1914, definitely assigned the direction of wireless telegraphy and the public wireless service to the Ministries of War and Marine.

The Ministry of Marine has jurisdiction over zones extending as far as 100 kilometres from the sea coast and the Rio de la Plata and 50 kilometres on each bank of the navigable rivers. The rest of the country is under the jurisdiction of the Ministry of War.

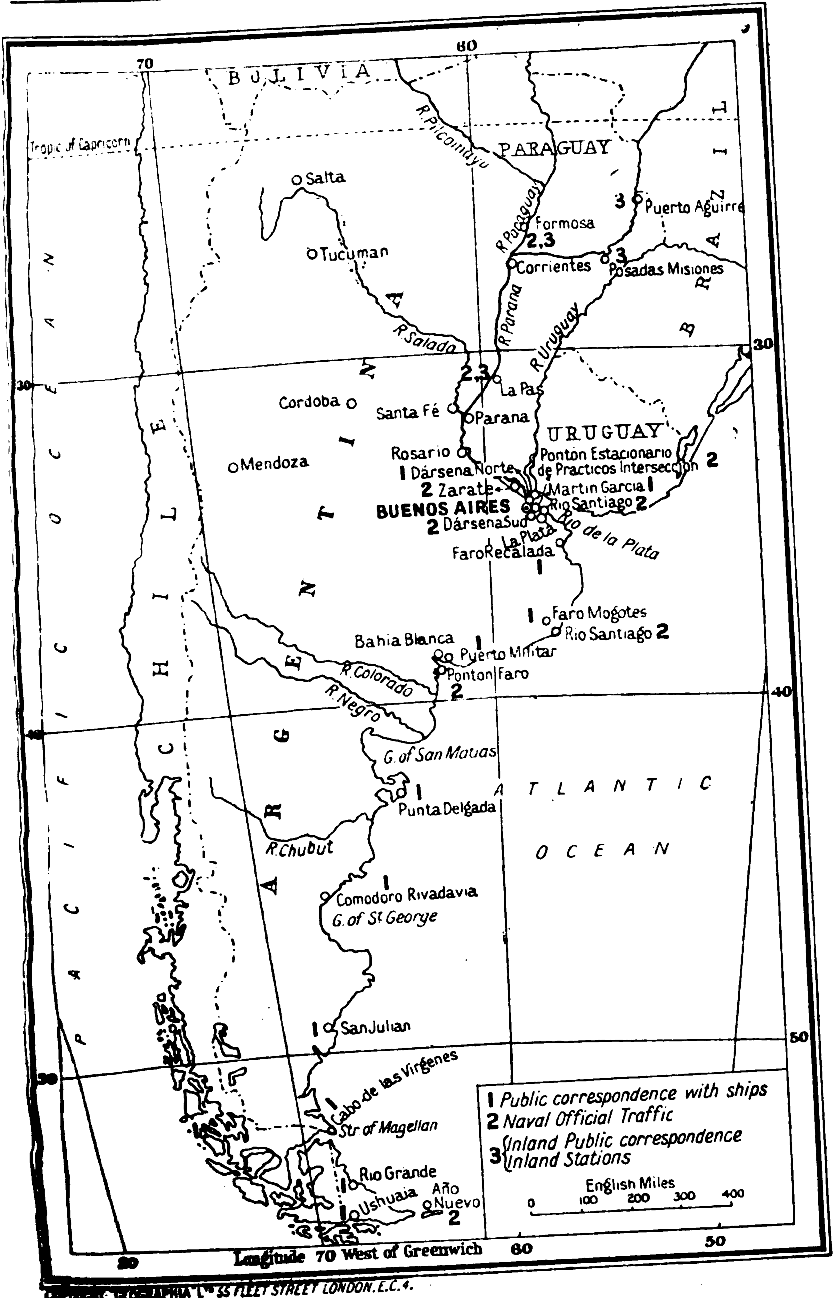
The chief of the public maritime radiotelegraph service is the General Secretary of the Ministry of Marine, under the direct control of which is the "División Servicio Radiotelegrafico," which has authority over everything concerning radiotelegraphy within the maritime zone. Under the control of the Ministry of Marine there are 21 coastal radiotelegraph stations, which are of the Telefunken system modified in accordance with the necessities of the Navy. According to the latest information, they are :—

Commercial traffic with ships	11
Naval official traffic only	6
Public correspondence in the inland service	2
Official correspondence inland	2

The "División Servicio Radiotelegrafico" has its own radiotelegraph works which construct and repair the greater part of the apparatus used in the Navy. These works are also able to effect repairs to radiotelegraph apparatus of merchant vessels calling at Argentine ports.

The Supreme Government has granted four concessions to different foreign companies to instal and work within the maritime zone high-power radiotelegraph stations. These companies are : the "Compañia Marconi de Telegrafia sin Hilos de la Plata" (English), which will place this country in communication with England, the "Pan-American Wireless Telegraph and Telephone Company" (North American), which has taken over the concession granted to the "Federal Holding Company" to communicate direct with the United States, the German "Wireless Telegraph Company of Berlin" represented by the Siemens Schukert Company, which holds the concession to communicate direct with Nauen. Lastly, there is the Spanish Company "Gasoliba Alvargonzalez Sociedad Anonima" of Radiotelegraphy and Radiotelephony, which will place Buenos Aires in communication with the Iberian Peninsula.

There are also some private stations of very small energy, the installations of which are used solely for experimental purposes.


BOLIVIA
PARAGUAY
BRAZIL
URUGUAY
ARGENTINA
CHILE
PACIFIC OCEAN
ATLANTIC OCEAN
Tropic of Capricorn
R. Pilcomayu
R. Paraguay
R. Parana
R. Uruguay
R. Salado
R. Colorado
R. Negro
R. Chubut
Salta
Tucuman
Cordoba
Mendoza
Santa Fé
Parana
Rosario
3 Puerto Aguirre
Formosa 2,3
Corrientes
3 Posadas Misiones
2,3 La Paz
Pontón Estacionario de Practicos Intersección 2
1 Dársena Norte
2 Zarate
Martin Garcia 1
Rio Santiago 2
BUENOS AIRES
2 Dársena Sud
La Plata
Rio de la Plata
Faro Recalada 1
1 Faro Mogotes
Rio Santiago 2
Bahia Blanca 1
Puerto Militar
Ponton Faro 2
G. of San Matias
1 Punta Delgada
1 Comodoro Rivadavia
G. of St George
1 San Julian
1 Cabo de las Virgenes
Str of Magellan
1 Rio Grande
1 Ushuaia
Año Nuevo 2
1 Public correspondence with ships
2 Naval Official Traffic
3 {Inland Public correspondence / Inland Stations
English Miles
0 100 200 300 400
Longitude 70 West of Greenwich
Copyright GEOGRAPHIA Ltd 55 FLEET STREET LONDON. E.C.4.

ORGANISATION.

The Station of Dársena Norte (LIA) transmits daily to all ships and coast stations a news service, as does likewise the radiotelegraph "top" which gives the official time.

There are no special publications devoted to wireless.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Federico Alvarez de Toledo ..	Minister of Marine..	Buenos Aires
Commander Ismael F. Galindez ..	General Secretary to the Admiralty and Head of the Public Maritime Wireless Service	Centro Naval, Florida 801, Buenos Aires
Cruiser-Captain Luis F. Orlandini ..	Head of the Radiotelegraphic Office	Ditto
Electrical Engineer Emilio E. Dagassan	Officer-in-charge of the Technical and Inspection Dept.	Ditto
Electrical Engineer Enrique Silbercissen	Officer-in-Charge of Constructional Works	Bella Vista, F.C.P.

ADMINISTRATION.

Below are given the law and regulations in force at the present time :—

A—Law No. 9,127 regarding radiotelegraphy.

B—Regulations made by the Executive Power for Radiotelegraphy.

C—Decrees of the Executive Power amplifying the regulations.

LAW.

A LAW NO. 9,127 PASSED BY THE NATIONAL CONGRESS ON SEPTEMBER 16TH, 1913.

ART. 1.—The wireless service within the national territory, and for international communications within a minimum distance of 1,000 kilometres, shall be exclusively under the control of the State.

ART. 2.—The executive shall attend to the erection of wireless stations within the national territory, and shall so select the sites for the coast ones that all ships sailing near our coasts and navigating our rivers may always be in touch with them.

ART. 3.—The sum of $400,000 national currency are hereby allocated to the above. This amount will be charged to General Expenses.

ART. 4.—The use of wireless apparatus in perfect working order is hereby declared compulsory for all ships calling at the ports of Argentina carrying fifty or more persons on board, counting the passengers and the crew, on and after ninety days have elapsed since the promulgation of this law.

ART. 5.—Wireless apparatus handled by skilled operators must have at all times a transmission power of not less than 200 kilometres for river craft, and not less than 500 kilometres for sea-going vessels.

ART. 6.—No ships will be allowed to leave port until the prescriptions of Arts. 4 and 5 have been complied with, and should the captain or the officer in charge try to elude or contravene this regulation, the superior local marine authority shall impose a fine of from 1,000 to 5,000 pesos. The party so fined can appeal to the federal magistrate of the district where the contravention has been committed. A double fine will be the penalty for a repetition of the offence.

ART. 7.—The Executive will promulgate the regulations in accordance with this law.

ART. 8.—The above Act of Parliament shall be communicated to the Executive.

The above was approved by the Argentine Congress in the city of Buenos Aires on the sixteenth day of September in the year of our Lord nineteen hundred and thirteen.

EXECUTIVE DECREE OF JULY 12TH, 1917.

This is divided into two parts. Of these Part I. only is printed.

PART I.

CHAPTER I.

SUB-SECTION 1.

B ART. 1.—The "General Rules and Regulations for the Radiotelegraphic Service in the Argentine Republic," as issued by the Secretary-General of the Marine Ministry, are hereby approved.

ART. 2.—The following Regulations and Ordinances are hereby repealed :

Regulations for the Radiotelegraphic Stations of the Navy (December 1st, 1900).

Regulations and Plan of Studies for the Radiotelegraphic Staff (November 27th, 1912).

Regulations for the Radiotelegraphic Service (July 5th, 1913).

Regulations for the Radiotelegraphic Service in the Argentine Republic (October 24th, 1914), and every other regulation affecting the Radiotelegraphic Service issued either as General Instructions, Orders of the Day or Circular Letters from the Marine Ministry, as from the year 1906 inclusive to this date.

ART. 3.—The necessary copies (of the new Rules, as mentioned in Art. 1) to be printed.

ART. 4.—This decree to be communicated, published, etc.

(Signed) Irigoyen,
F. ALVAREZ DE TOLEDO.

The following are the documents approved by the Executive Decree above quoted :—

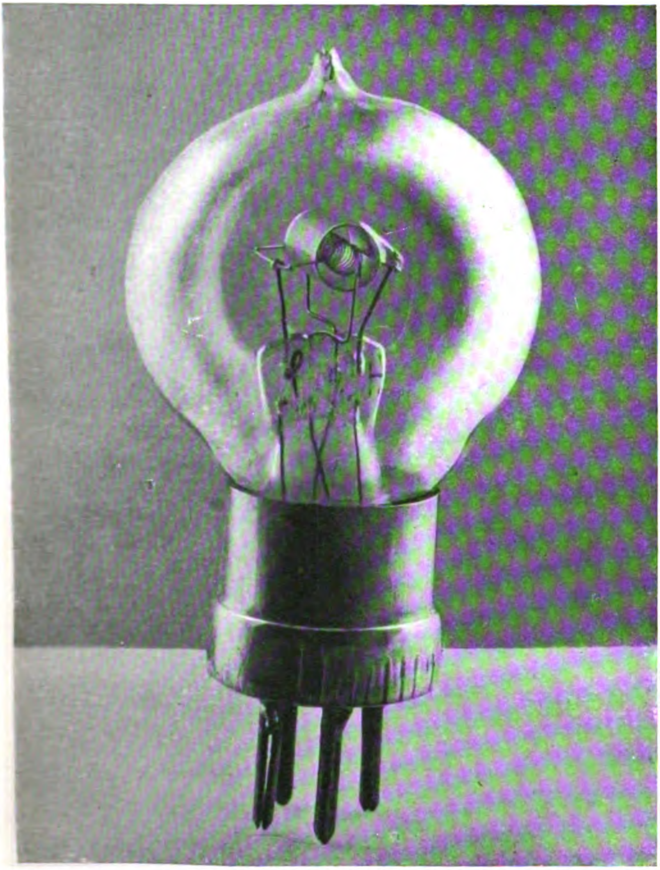
SUB-SECTION 2.

ORGANISATION OF THE RADIOTELEGRAPHIC DEPARTMENT.

ART. 1.—The Radiotelegraphic Service constitutes a Department of the General Secretaryship of the Ministry of Marine.

ART. 2.—The following duties correspond to this Department:—

(*a*) To intervene in everything affecting



"FRENCH" TYPE THREE-ELECTRODE VALVE.

[To face page 80

the military and public radiotelegraphic service depending from the Ministry of Marine and under its inspection and control.

(*b*) To intervene in the formation of reports and in the claims and suits that may be promoted.

(*c*) To study and comply with the international laws, regulations, instructions and conventions or pacts that may affect this service.

(*d*) To work in the reforms tending to improve the service both in connection with technical details and those of a purely disciplinary character.

(*e*) To intervene in the preparation of instruction plans and the examination of subordinate radiotelegraphists and civil operators, to propose their promotion and to issue the corresponding credentials (*patentes*).

(*f*) To intervene in the purchase of radiotelegraphic materials, giving advice and reporting on results.

(*g*) To attend to that part of the correspondence and intercourse with the Berne International Office referring to this service.

Art. 3.—The Radiotelegraphic Service Department will be divided into the following sections:—

(*a*) Inquiries, Correspondence, and Archives.

(*b*) Technical Inspection and Superintendency.

(*c*) Shop, Installations, and Repairs.

(*d*) Test of apparatus and materials.

(*e*) Accounting.

Art. 4.—The staffs in the land stations and in the floating lighthouses will be as permanent as consistent with the good service. The staffs will in matters affecting discipline, re-examination and licences, be subordinate to the Secretary of the Ministry; but the last-named officer will see that the General Direction of Personnel is kept informed of the changes occurring in this service.

With the General Secretary rests the duty of putting before the General Director of Personnel any changes that may be considered necessary in the radiotelegraphic staffs on board units of the Navy.

CHAPTER II.

Regulations Governing the Radiotelegraphic Service.

Sub-section 1.

Jurisdiction of the Several Ministries according to Law No. 9127.

Art. 1.—The national territory is hereby divided into two zones for the purposes of jurisdiction and regularisation affecting the service of radiotelegraphic installations. The aforesaid zones are as follows:—

1. The *Maritime Zone*, which includes all ship stations in the maritime territorial waters and navigable rivers, besides all land stations situated within one hundred kilometres from the sea and River Plate coasts and those situated within fifty kilometres from the banks of any other navigable rivers.

2. The *Terrestrial Zone*, which includes all other installations on national territory which are not covered by the above.

Art. 2.—(*a*) The Maritime Zone is under the jurisdiction of the Minister of Marine, who is responsible for the control of the Public Radiotelegraphic Service and who prescribes the rules and regulations for wireless service in this particular zone.

(*b*) The Minister of Marine shall also undertake the duty of transmitting all information of any nature which may be asked from him by the International Bureau of Berne.

Art. 3.—(*a*) The Terrestrial Zone is under the jurisdiction of the Minister of the Interior, who controls the Public Radiotelegraphic Service and who prescribes the rules and regulations for wireless in this particular zone.

(*b*) In special cases when a state of siege is declared, all installations in this zone shall be placed under the control of the War Office.

Art. 4.—Other Executive Offices can order the installation of wireless stations for their exclusive use, but in such cases the working of such installations must be authorised be the Minister exercising control in the respectivy zones, and the rules and regulations prescribed for the latter must be observed in these particular stations.

Art. 5.—All wireless installations erected in the national territory must observe the international rules and regulations adhered to by the Government of the Republic, and the General Law regulating the Telegraphic Service must be observed in all matters appertaining to the Public Radiotelegraphic Service.

Sub-section 2.

Permits for the Installation of Privately Owned Radiotelegraphic Stations.

Art. 1.—Law 9127 having been passed with the object of nationalising of the wireless service, the installation of high-powered wireless stations by private individuals or corporations shall only be allowed in the national territory when such installations are destined for inter-continental communication.

Art. 2.—The granting of such concessions as authorised by Art. 1 corresponds to the Minister in whose jurisdiction the new station is to be erected.

Art. 3.—Where the Ministry having control over the zone where the wireless installation is to be erected has given his consent, all the rulings of said Ministry, or any other of its decisions regarding the stations directly dependent on the said installation, must be obeyed unquestionably.

Art. 4.—In general it shall be the duty of the Minister of the Interior to negotiate the bases of agreements in course of conclusion with neighbouring countries, and he will communicate with the Minister of Marine the results arrived at in the course of such negotiations, so that the latter may give effect to any such conventions in so far as they affect his department. The Minister of Marine shall have the right of being consulted in the negotiation of the bases for such conventions.

Art. 5.—No radiotelegraphic (transmitting or receiving) station will be erected without obtaining first the necessary licence from the Minister in whose jurisdictional zone the station is to be established.

Art. 6.—To obtain the licence referred to in Art. 5, the installation must fulfil the following requirements:—

(1) The primary transmitting power must not exceed 50 watts.

(2) The wave-length must not exceed 300 metres in the transmitter.

(3) The receiver may be suitable to receive waves of any length, providing that

the Executive Government have no objection thereto.

(4) The installation must not be used for any interchange of messages in the public service. It will be devoted to experimenting, and only when in the judgment of the Government no harm or disturbance would arise from its use to the nearest national stations can the installation send or receive special messages.

ART. 7.—Anyone infringing the rules set out in Arts. 5 and 6 will be penalised in accordance with the penalties established in the General Law relating to the National Telegraph Service.

ART. 8.—Private installations authorised in accordance with Art. 6 must be inspected by the official inspectors, who are entitled to all the information and data they may demand. These installations must be registered and the wireless apparatus must be stamped by an inspector. The Minister exercising jurisdiction in the respective zone can order at any time the closing of authorised private wireless installations.

SUB-SECTION 3.

REGULATIONS AFFECTING ALL INSTALLATIONS ON NATIONAL TERRITORY AND ON BOARD SHIPS.

ART. 1.—The power to be used in all installations on land will be limited to that necessary for communication with the nearest stations in the system. Coast installations which must have high power in order to communicate at long distances are excluded from this limitation.

ART. 2.—(*a*) All installations open to public service must receive all messages sent by stations under the control of any Ministry or by any of the National Telegraph offices, provided that the regulations established by each administration regarding the radiograms which may go over their lines are complied with at the original stations from which the messages are radiated.

(*b*) Foreign vessels under the flag of a country which has not adhered to the London Convention will be allowed to communicate with Argentine coast and stationary ship stations, provided the agents representing the Company owning such foreign ships ask for the extension of this privilege and fulfil all the requirements established by the present Regulations and by the London Radiotelegraphic Convention.

ART. 3.—Radiograms will be transmitted in the order of priority established by the Law on National Telegraphs and the Radiotelegraphic Convention, namely:—

(*a*) Distress calls have absolute priority upon any other communication; then follow:—

(*b*) Service notices of whatever origin when referring to "the Safety of Life at sea" or containing information of an urgent character for navigation.

(*c*) Messages from the Executive Government.

(*d*) Service notices from the Radiotelegraphic stations.

(*e*) Messages from the Ministry of Marine, its dependencies and its fleets.

(*f*) Service notices from the shipping companies.

(*g*) Private messages.

ART. 4.—In accordance with Art. 101 of the Law on National Telegraphs, messages belonging to the same category will be transmitted by the station of origin in the order in which they are delivered to this station, and by the relay stations, in the order in which they are received.

ART. 5.—In accordance with Art. 102 of the Law on National Telegraphs, private messages stamped as urgent in the "telegraph" system, should have priority in transmission, even upon messages of a superior category not stamped as urgent.

ART. 6.—Any radiogram referring to the internal service of a fleet, squadron or division in march, will be considered as urgent and transmitted accordingly.

ART. 7.—Every official unprepaid radiogram or telegram sent by Marine officers with authority to do it, will be signed with the corresponding telegraphic address, and such messages will be legalised outside their text with the seal and signature of the competent officer on land or on board.

ART. 8.—The following is a list of Marine Officers who are authorised to send unprepaid radiograms and telegrams, according to the Navy Disciplinary Regulations:—

Secretary-General of the Ministry.
Chief of the Radiotelegraphic Department.
Chief of the Hydrography, Lighthouses and Buoys Department.
Inspector of the Marine Ministry's Dependencies in Tierra del Fuego and Cabo Virgenes.
Director-General of Personnel.
Director-General of Material.
Director-General of Administration.
Prefect-General of Ports.
Prefects of Maritime and River Zones.
Director of the Naval School.
Director of the Training School.
Director of the Mechanics School.
Chiefs of Fleets, Divisions, Squadrons, Light Squadrons or Groups.
Chiefs of Staff of Squadrons and Divisions.
Chiefs of shipyards and Maritime Zones.
Chief of the Aviation Grounds in "Fuente Barragán."
Commanders of Ships.
Commander of the Marine Depot (*Depósito de Marinería*).
Command of Coast Artillery and "Martín García."
Managers of Coast Radiotelegraphic Stations.
Managers of Lighthouses and Director of the "Año Nuevo" Observatory, when addressing the Chief of Hydrography, Lighthouses and Buoys, or the sectional chiefs in his jurisdiction.
Sub-Prefects and their Assistants when addressing the Prefect-General or the jurisdictional Prefect.

The lists of officers belonging to other branches of national service and who have authority to forward unprepaid messages will be communicated to the Radiotelegraphic Offices when necessary.

ART. 9.—The Manager of a station may demand from any sender of a radiogram proof of his identity before transmitting the message, acting in accordance with Arts. 82 and 83 of the Law on National Telegraphs of 1875.

ART. 10.—In order to improve the service and with a view to regulate the exchange of radiograms between units of the Navy, coast stations and foreign ships—strictly following the regulations established by the London International Radiotelegraphic Convention of 1912—the Radiotelegraphic Stations belonging to the Navy—whether opened or not to

the public—will act in the way hereinafter detailed to make their calls, answers, transmissions, requests of rectification, repeats and notices of reception—viz.:—

1. *Calls.*

Every call is made up by the sign ▬●▬●▬ followed by the letters of the station to be called, repeated three times, and by the word "de" (▬● ●), followed by the call letters of the calling station repeated three times.

Example of a Call.—Station LIA calls station LIC thus: ▬●▬●▬ LIC LIC LIC ▬● ● LIA LIA LIA.

2. *Answers.*

The station that is being called answers thus: The sign ▬●▬●▬ followed by the call letters of the calling station, repeated three times; then the word "de" followed are by the call letters of the called or answering station, and ending with the sign ▬●▬ (invitation to transmit).

Example of an Answer.—Station LIC answers its call to station LIA inviting the latter to transmit its communication, thus: ▬●▬●▬ LIA LIA LIA ▬● ● LIC ▬●▬

3. *How to Transmit a Radiogram.*

The following are the elements in which is divided every radiogram:

1. Sign of attention ▬●▬●▬
2. Preamble.
3. Supplementary Service instructions, if any.
4. Address.
5. Text of the radiogram.
6. Signature.
7. Signal of end of message ●▬●▬●
8. Call letters of the transmitting station.

If there are several radiograms to transmit these letters will be sent only after the last message.

The *Preamble* of a radiogram is composed as follows:

- I. The word "Radio."
- II. Class of the radiogram.
- III. Category of the radiogram. (Class and category are expressed by a group of letters called *prefix.*)
- IV. Name of the office of origin.
- V. Number of the radiogram.
- VI. Number of words.
- VII. Date and hour in which the radiogram was received for transmission.
- VIII. Service instructions.
- IX. Sign ▬● ● ●▬ (Double hyphen).

Supplementary service instructions are those which are transmitted upon request from the sender, and are charged for.

The following order will be observed in the transmission of every radiogram:

Preamble:

1. Sign of attention ▬●▬●▬
2. The word "*Radio.*"
3. Class of the radiogram.
4. Category of the radiogram.
5. Name of office of origin.
6. Number of the radiogram.
7. Number of words.
8. Date and hour in which the radiogram was received for transmission.
9. Service instructions.
10. The sign ▬● ● ●▬

Supplementary Service Instructions:

11. Supplementary service instructions (if any).
12. The sign ▬● ● ●▬

Address:

13. The address (which will have at least two words).
14. The sign ▬● ● ●▬

Text:

15. The text of the radiogram.
16. The sign ▬● ● ●▬

Signature:

17. Signature.
18. Signal of end of message ●▬●▬●
19. Call letters of the transmitting station.

Examples.—1. At 8.15 a.m. of the 15th of a month was delivered at the *TORO* station a radiogram for transmission, as follows: López Sarmiento 667 Buenosaires. Send by fast freight 10 cases Viscosine oil. Suárez.

The above radiogram will be transmitted in the following order: ▬●▬●▬ Radio (prefix of class and category) *TORO.* 175 13 15 8.15 m. ▬● ● ●▬ López Sarmiento 667. Buenosaires ▬● ● ●▬ Send by fast freight 10 cases Viscosine oil ▬● ● ●▬ Suárez ●▬●▬● LMP.

2. The Radiotelegraphic installation of "Dársena Norte" receives the following message on the 25th at 8.15 p.m. from *Morón* for *Benitez,* steamship *Rawson:* "*On arrival you will find letter and documents asked for. Rodríguez.*" This radiogram will be transmitted thus: ▬●▬●▬ Radio (prefix) Morón 16 14 25 8.15 s. ▬● ● ●▬ Benitez Steamship Rawson ▬● ● ●▬ On arrival you will find letter and documents asked for ▬● ● ●▬ Rodríguez ●▬●▬● LIA.

3. Example of a radiogram from the ship *Cabo Corrientes,* on the 15th at 3 p.m., to be transmitted to Berlin, via Monrovia, and reading: Schroeder Uhlandstrasse 35 Berlin. Send motor type DRS 10 HP. Wagner. This message will be transmitted thus: ▬●▬●▬ Radio (prefix) Cabo Corrientes 25 11 15 3 s via Monrovia ▬● ● ●▬ Schroeder Uhlandstrasse 35 Berlin ▬● ● ●▬ Send motor type DRS 10 HP. ▬● ● ●▬ Wagner ●▬●▬● LMO.

4. *Notice of Reception.*

When the receiving station receives a radiogram and has verified the number of words stated in the preamble, notice of reception must be given in this form:

"Call letters of the transmitting station followed by the word *de* (from) followed by its own call letters. Then the letter *R,* the number of the radiogram and the sign to indicate end of transmission ●▬●▬● or end of work ● ● ●▬●▬, as the case may be.

Example: ▬●▬●▬ LIA de LMX R 76 ●▬●▬●

5. *How to Ask for a "Repeat."*

The method to ask for a repeat will be the following:—

"The characteristics of the transmitting station will be sent followed by the word *de* (from), and then by the characteristics of the receiving station, and the combination QTA followed by the number of the radio."

Example: ▬●▬●▬ LIA de LMX QTA 77 ▬●▬

If only a part of the radiogram is to be repeated, the message will be: ▬●▬●▬ LIA de LMX QTA 78 desde (from) ...... ▬●▬

Should the receiving station have any doubt as to the radiogram received or the number of its words, a rectification may be requested thus:—

"Sign of attention ▬●▬●▬; call letters of the transmitting station, once; the word *de* (from); call letters of the receiving

station; the combination QTC; the number of the radiogram to be rectified and the signal ▬●▬

Example: LMX asks from LIA the rectification of radiogram 71: ▬●▬●▬ LIA ▬●● ● LMX QTC 71 ▬●▬

Station LIA answers: ▬●▬●▬ LMX ▬●● ● LIA QTC 71 r z p 2 v w k r ●▬●▬●

Here the letters and figures r, z, p, 2, v, w, k, r are the initial letters of each word and the first figures of each number.

6. *How to Express the Number of Words.*

When the actual number of words signalled is not the same as the number of words charged for, the fact should be expressed as a common fraction in which the numerator will indicate the number of words charged for and the denominator the actual number of words transmitted.

Take as an example the following radiogram: Alvarez Calle Corrientes 725 Buenosaires. Ship immediately: 100 litres benzine, 5 kilograms oakum, 5 kilograms Viscosine oil Suárez 22/18 (22 ▬● ●▬● 18).

The real number of words in the message is 18, but the three punctuation marks and the *underline* are counted and charged as words.

7. *How to Give the Date and Hour.*

The date and the hour will be indicated by two groups of figures: the first group will represent the date of the month, and the second the hour and minutes followed by the letter *m* or the letter *s*, as the case may be, meaning *before noon* and *after noon*, respectively.

For instance, in a message received for transmission the 15th of the current month at 4.36 p.m., this information will be given thus: 15 4.36 *s*.

8. *How to Use the Sign* ▬● ● ●▬

Hereafter the sign ▬● ● ●▬ will be used to represent the double dash (=), and not as heretofore to represent the letter *elle* (*ll*). This letter *ll* will be represented from now on by two consecutive *eles* (*l*) (●▬● ● ●▬● ●).

9. *How to Request a Station to Wait.*

When a coast station is not ready to receive a number of radiograms after the preliminary communications from a ship, as detailed in Art. XVIII. of the Rules annexed to the London Radiotelegraphic Convention of 1912, the land station will have to instruct the ship to wait, and such instructions will be communicated in the following manner: ▬●▬●▬ LMO ▬●● ● LIA ●▬●▬● ▬● 50 ●▬●●● 10 ●▬●▬●

This means that the station LIA acknowledges receipt of communication from station LMO, and using the service TR notation informs LMO that it has 50 words to communicate, and begs the ship station to wait ten minutes. In these communications the figures will be transmitted using the abridged notation.

10. *Use of TR Notation.*

Service communications will be preceded by the *TR* notation.

Art. 11.*—When the text of a radiogram is totally or partially in plain language, the following information will be given in the radiogram:—

1. Total number of compound words as a basis for the charge.
2. Number of plain words in plain language or with a conventional meaning.
3. Number of groups of figures or letters, expressed thus:

20/12/6.

This rule applies specially:—

(*a*) When a radiogram in plain language contains words of more than 15 letters (international system of counting words) or more than 7 syllables (according to our national rule).

(*b*) When a radiogram in code language contains words with more than 10 letters.

(*c*) When the radiogram contains groups of figures or letters of more than five characters.

Art. 12.—A radiogram must not contain more than 100 words. If the sender needs more words he must divide his communication in as many messages as necessary to comply with the above rule, and these radiograms will be transmitted alternatively with those from other senders presented for the next turn.

Official unprepaid radiograms must not contain more than 50 words.

Art. 13.—(*a*) Radiotelegraphic messages transmitted, relayed or received will be kept in the utmost secrecy, as well as the note books, traffic sheets, reports and liquidations of accounts. It is forbidden to divulge the contents of communications intercepted during service hours, even if they do not affect the national public service or the naval service.

(*b*) If an intercepted radiotelegram contains damaging statements affecting national interests in land or at sea, the information must be communicated at once to the superior of the operator picking up the message, and this operator must keep a memorandum of the text and address of the radiogram concerned.

Art. 14.—It is the duty of every radiotelegraphist to communicate without delay to his superior the contents of intercepted radiograms containing excitations to revolt or affecting the safety of the Nation. This information must be transmitted by the superior officer to a competent authority.

Art. 15.—Radiotelegraphic communications, like ordinary telegrams, are confidential; therefore, persons not belonging to the staffs shall not be admitted into the stations.

Art. 16.—In cases referring to the Radiotelegraphic service, not covered by these regulations, the international radiotelegraphic conventions and the Law on National Telegraphs will apply. But if a rule or regulation is not found, the case must be submitted in consultation to the nearest (superior) office or to the Radiotelegraphic Department.

To insure a good service, it is the duty of coast stations to give to ship stations all the information they may require.

Art. 17.—Radiograms will be delivered following the rules contained in Art. 32 of the Law on National Telegraphs.

Sub-section 4.

Chief of the Public Maritime Radiotelegraphic Service.

Art. 1.—The Secretary-General of the Ministry of Marine shall have under his control the Public Radiotelegraphic Maritime Service, and his duties will be as follows:—

(*a*) He shall supervise all coast stations and ship stations after installation, both of

* This article and the article following would appear to be intended to apply rather to purely Argentine working, as they seem inconsistent with the provisions of the International Telegraph and Radiotelegraph regulations.

national and foreign register, calling at national ports, and shall also supervise all coast stations, as prescribed in Article 2 of Law 9127.

(*b*) He shall control the service of the said stations and will draft the regulations for same, taking care that the rules herein established and the international Conventions accepted by the National Government are duly fulfilled.

(*c*) He shall see to it that all regulations concerning rates, discounts and reimbursements, as well as any others that may be later on prescribed by the Post and Telegraph Office regarding the requirements of radiograms relayed to the National Telegraph lines are faithfully complied with.

(*d*) He shall forward to the Office of Posts and Telegraphs all claims made to the Prefect-General of Ports by Steamship Companies, ship captains or passengers referring to rates, discounts and reimbursements.

(*e*) He shall issue through the Office of the Prefect-General of Ports the permits for the erection of wireless on board those ships which may have obtained leave to do so in accordance with these Regulations.

(*f*) He shall issue licences to the wireless telegraphists operating at all stations working within the Maritime Zone, so soon as the conditions affecting such licences have been fulfilled in accordance with these Regulations.

(*g*) He shall cancel such licences and permits granted to stations and operators within the Maritime Zone as it may, for any good reason, be found necessary to withdraw.

(*h*) He shall enforce, through the Office of the Prefect-General of Ports, the payment of all fines imposed on shipping companies or ships, and shall direct the deposit of the said fines in the National Bank to the order of the Director of Posts and Telegraphs.

(*i*) He shall have it in his power to authorise the installation of wireless by private individuals or corporations within the Maritime Zone in accordance with Chapter II., Sub-section 1, Art. 5.

Art. 2.—The head of the Public Maritime Radiotelegraphic Service shall act jointly with the Director of Posts and Telegraphs in the following matters :—

(*a*) In all matters referring to wireless stations installed on the Maritime Zone.

(*b*) In all matters referring to rates, discounts and reimbursements of the Public Radiotelegraphic Maritime Service in order to obtain a monthly settlement of accounts by the shipping companies or ship captains with the Office of Posts and Telegraphs in conformity with the schedules prepared by the latter.

(*c*) In the investigation of any questions that may arise for consultation from the Wireless International Service. In all such cases, the Office of Posts and Telegraphs shall communicate with the foreign administrations and authorities concerned.

Art. 3.—The Director of Posts and Telegraphs shall deal directly with the Secretary-General of the Ministry of Marine in all cases relating to the Maritime Radiotelegraphic Service.

Art. 4.—The necessary instructions to give effect to the provisions of Art. 1, paragraph (*c*), and all other regulations concerning the internal management of the radiotelegraphic stations in this jurisdiction, will be issued through the Department of Radiotelegraphic Service. These instructions shall be communicated to the stations by means of private circulars.

Sub-section 5.

The General Office of the Prefect-General of Ports.

Art. 1.—The duties of the Prefect-General of Ports will be as follows :—

(*a*) He shall give effect to the provisions made in Articles 4, 5 and 6 of Law 9127 and shall direct the deposit at the Bank of the "Nación Argentina" of the fines imposed for the non-fulfilment of said provisions The money so deposited must be placed to the order of the Director of Posts and Telegraphs.

(*b*) He shall receive from shipping companies, captains or passengers all complaints regarding unsatisfactory service in the coast and ship stations, and shall forward them to the head of the Maritime Radiotelegraphic Service.

(*c*) Should any complaints be made upon the arrival in port of any vessel, the Prefect shall collate the evidence and forward it to the head of the Naval Radiotelegraphic Service, and he shall act in the same manner should the complaints be made in writing.

(*d*) He shall prevent the departure of any ship which may have failed to make the necessary deposit at the National Bank (to the order of the Director of Posts and Telegraphs) of the fines imposed in accordance with Article 6 of Law 9127.

(*e*) Both upon the arrival and departure of merchant ships the Prefect shall have the wireless installations inspected in order to ascertain whether they are in perfect working order and whether the power of the apparatus is that fixed by Law 9127.

Art. 2.—The General Office of the Prefect-General of Ports will refer all matters concerning ship stations to the Director of the Public Maritime Radiotelegraphic Service.

Art. 3.—Besides the inspection and control of ship stations in territorial waters and on craft of all register the general office of the Prefect-General of Ports must attend to the following :—

(1) The dismantling of the transmitting apparatus of the wireless installation as soon as the ship has moored or anchored.

This precaution could be dispensed with, with the consent of the Maritime authority, in the ports of the Southern Coast and in river ports, where no radiotelegraphic land stations are in existence.

(2) He shall ascertain whether the wireless operator or operators have licences corresponding to the installation they are working, in conformity with Article X. of the Service Regulations annexed to the London Convention.

(3) In such cases as those covered by Article XII. of the Service Regulations above mentioned, the Prefect-General of Ports shall act jointly with the Director-General of Supplies of the Ministry of Marine in order to give effect to the provisions of the said Article.

Art. 4.—First contraventions of the provisions of Art. 5, paragraph 1, will be recorded by the General Office of the Prefect-General of Ports, and each of those following the first will cause a fine of one hundred pesos, national currency.

Sub-section 6.

Coast Stations.

Under the Control of the Head of the Maritime Radiotelegraphic Service and Open to the Public.

Art. 1.—The internal organisation and discipline of these stations will be subject to the provisions of these regulations and those that may be enacted hereafter.

Art. 2.—Coast stations not open to the public may or may not appear in the Official Nomenclature Lists at the option of the Minister of Marine.

Art. 3.—Messages cannot be directly received from the public at the coast wireless stations open to the public. Such messages must be presented for transmission at the nearest telegraph office and thence they will be transmitted by telegram to the radiotelegraphic station. Messages can, however, be received directly from the public radiotelegraph stations in localities where there is no telegraph office or the existing telegraph office is not connected to the radiotelegraph stations.

Another exception to this prohibition is that of private radiograms from men in the Navy Service and addressed to stations in the Ministry of Marine's Zone. Such messages may be accepted at any Ministry of Marine radiotelegraph coast station—connected or not to a local telegraph office—and forwarded to destination provided the corresponding rates are prepaid.

The radiotelegrams referred to in the first paragraph shall follow this route, namely :—

(*a*) Messages delivered at a Telegraph Office shall be sent by wire to the coast station that is to transmit them to a ship, or to the coast station nearest to the transmitting coast station.

(*b*) Messages delivered by the public at a radiotelegraphic station will be sent by wireless route to the nearest telegraphic office having efficient connections, and thence by wire to destination or to the coast station that is to transmit them to a ship.

(*c*) Messages addressed to ship stations that are within the range of the coast station originating them, will be transmitted direct.

Radiograms delivered by the public in coast stations destined either to places inland or abroad, will be accepted only conditionally. The same rule will apply to messages delivered at a telegraph office to be transmitted by wireless when the ordinary telegraph communication is interrupted between the telegraph office taking the message and that at the place of destination.

Art. 4.—The following shall be the *Controlling Stations* for the supervision of the wireless service in general, and particularly for the fulfilment of this Regulation and of those of the London Convention, at all coast and ship stations of the Maritime Zone :—

Darsena Norte Station.—This station will control the port of Buenos Aires and its vicinity.

La Paz Station.—This station will control the port of Rosario and its vicinity.

Rio Santiago Station.—Will control the port of La Plata and its vicinity.

Puerto Militar.—This station will control its own port besides Bahia Blanca and its vicinity.

Art. 5.—An inspector appointed by the Ministry of Marine shall control the wireless service at Tierra del Fuego.

Art. 6.—For the purpose of the accounts the coast station in each case shall be considered as terminal station for all messages sent to ship stations and as stations of origin for all messages coming from the ships.

Art. 7.—The coast stations shall give immediate priority to messages of distress sent by ships, and shall forward them over the land lines as urgent messages.

Art. 8.—Coast stations shall not transmit by the telegraph wires unprepaid messages received from ships or from the Ministry of Marine dependencies, if such messages can reach their destination by wireless. Exception, however, is made in the case of "urgent messages" even if unprepaid, which may be delayed through adverse atmospheric conditions or other causes.

Art. 9.—When a ship belonging to the National Navy sends several times the interrupting signal ▬ ● ● ▬ ● ● ▬ ● ● ▬ followed by her call letters, the merchantmen and national coast stations shall immediately suspend their communications in order to facilitate those of the Navy unit. This rule will not apply when the communications being exchanged at the time refer to a shipwreck or danger to lives on sea.

The interrupting signal, which is called "Naval Service," will be sent when authorised by the commander of the respective ship ; but only in cases of such urgency that it is not possible to wait for normal service time.

Art. 10.—Excepting in cases of shipwreck, the Dársena Norte Station has priority of working over all others. When this station sends the signal ▬ ● ● ▬ ● ● ▬ ● ● ▬ all other land and national merchant ship stations will cease communicating, to allow Dársena Norte a clear field.

Art. 11.—The National Radiotelegraphic stations will be run by the staffs described in the Official List and in Chapter III., Division One.

Art. 12.—The National Radiotelegraphic coast stations performing service as the National Telegraph lines, will attend to the reception and transmission between them of public service radiograms at fixed hours and for reasonable periods every day ; all this to be established by agreement.

Art. 13.—All national ship and land radiotelegraphic stations shall suspend their communications for a period fixed by the stations with authority to do so. The former will in that event receive from the latter the radiotelegraph signal referred to in Articles 9 and 10.

Sub-section 7.

National Warship Stations.

Art. 1.—Warship and coast stations shall use for official messages the maximum wavelength possible for their aerials, and should they have to transmit messages to Argentine merchantmen or to foreign merchant steamers they must use the wave-lengths specified by the London Convention and by these Regulations.

Art. 2.—In order to avoid difficulties in the general radiotelegraphic service arising from the use by and between Navy units employing Wireless, and which work with the normal wave-length (600 metres)—thus producing interruptions that prevent the reception of other radiograms—this method will be followed, namely :—

1. For Wireless communications in general,

between Navy units, their stations shall employ the following wave-lengths :—

1,000 METRES: Ships *Moreno*, *Rivadavia*, *General San Martin*, *General Belgrano*, *Pueyrredon*, *Garibaldi*, *Buenos Aires*, *9 de Julio*, *Presidente Sarmiento*, *Pampa*, *Chaco*.

450 METRES: Ships *Almirante Brown*, *Libertad*, *Independencia*, *Paraná*, *Rosario*, *Patria*, *Córdoba*, *La Plata*, *Catamarca*, *Jujuy*, *Entre Rios*, *Misiones*, *Corrientes*, *Guardia Nacional*, *1° de Mayo*, *Ministro Ezcurra*, *Alférez Mackinlay*, *Ona*, *Querandi*, *Azopardo*, *Piedra Buena*, *Vicente Fidel Lopez*, *Uruguay*, and *Gaviota*.

2. When the distance between ships does not allow of the establishment of wireless communication with the wave-length mentioned above (No. 1) the operator shall use the efficient wave-length that his apparatus may permit.

3. The normal 600 metres wave-length shall be used exclusively for general service between ships and land stations, national or foreign.

4. After the radiotelegraphic communication is established by any means as mentioned above (Nos. 1 and 2), the operator shall endeavour to work, considering the range, with the minimum power required for obtaining effective communication in accordance with the provisions of the London Radiotelegraphic Convention.

5. The syntonisation of the radiotelegraphic stations on board ships of the Navy, shall be controlled and regulated by the Radiotelegraphic Service Department, in accordance with the wave-lengths established by Art. 1 and taking into consideration the normal wave of 600 metres.

SUB-SECTION 8.

WIRELESS ON MERCHANTMEN.

ART. 1.—All merchant vessels, whether mechanically propelled or otherwise, carrying fifty or more persons (passengers and crew) must be fitted with a wireless installation in perfect working order, except in the cases referred to in Articles 4, 5 and 6, below.

The above applies to all craft in similar conditions entering or leaving Argentine ports.

ART. 2.—Wireless apparatus in charge of an efficient operator must have at all times a transmitting power of no less than 200 kilometres for river craft and of no less than 500 for sea craft.

ART. 3.—No ships will be allowed to clear when the above provisions have not been duly complied with, and should captains or ship masters endeavour to avoid or contravene this rule the Superior Port Authority can impose a fine of not less than 1,000 pesos and not exceeding 5,000. Those penalised in that way can appeal to the Federal Court having jurisdiction on the locality where the fault has been committed. The fine will be doubled in cases of repetition of the offence.

ART. 4.—Ships exclusively navigating the rivers of the Republic are exempted from the obligation of carrying wireless on board, but those plying between Argentine and Uruguayan ports on the River Plate and those employed in the coasting trade must carry radiotelegraphic installations.

ART. 5.—The following are the exceptions to the rule established by Article 1 :—

(1) Those ships which only by accident or under exceptional circumstances carry fifty or more passengers, either because the captain has been obliged to get extra help in order to replace the sick members of the crew, or because he has taken aboard the passengers and crew of some vessel in distress.

(2) Those ships on which, by reason of the route they follow or because of the conditions on which they set out to sea, it may be considered that the carrying of a wireless installation would be useless and superfluous.

(3) Those ships where the number of passengers may be raised by exceptional or accidental circumstances to 50 or more, owing to their having received on board these additional passengers in the course of the voyage for the purpose of transhipment, with the additional proviso that such vessels do not go farther than 150 miles from the nearest coast.

(4) Sailing ships of primitive construction, such as pontoons and lighters, when it is impossible to fit them with wireless.

ART. 6.—Vessels which have started their voyage without meeting the requirements of these regulations cannot be observed or attended to it, by reason of bad weather or through *force majeure*, they are compelled to seek refuge in Argentine ports.

ART. 7.—All foreign ships carrying wireless installations are divided into three classes according to the classification made regarding ship stations in Article XII. of the Regulations annexed to the Radiotelegraphic Convention signed in London on July 5th, 1912. These classes are :—

FIRST CLASS.—Vessels carrying a permanent wireless service.

All vessels fitted to carry 25 or more passengers are included in the *First Class*—

(1) If their average speed be of 15 knots or more.

(2) If they have an average speed of over 13 knots; but only provided they carry 200 or more persons (passengers and crew), and provided also that they traverse a distance of more than 500 nautical miles between two ports of call. These ships, however, may be classified under the second class provided that they maintain a continuous watch.

SECOND CLASS.—Vessels having a limited wireless service.

Those ships fitted to carry 25 or more passengers which for some other reasons may not have been included in the first class are included in this second class.

All ships of the second class must, whilst at sea, keep continuous watch during seven hours every day, and watch also for ten minutes at the beginning of each of the remaining seventeen hours.

THIRD CLASS.—To this class belong those ships, national or foreign, carrying a wireless installation without any fixed working hours or not included in the first and second classes.

The owner or builder of a ship included in the second or third class has the right to demand that in the certificate of safety issued to him mention be made of the fact that the shi belongs to a higher class, provided the ve fulfils the requirements laid down for th higher class.

ART. 8.—National and foreign ships carrying wireless must keep a constant watch in the following cases :—

(1) Passenger ships running to Montevideo.

(2) All ships belonging to the first class.

(3) Ships belonging to the second class, whenever they are at a distance of over 500 miles from the nearest coast.

(4) Ships carrying more than 50 passengers

and which, by reason of their movements, are obliged to navigate at a distance of over 1,000 miles from the nearest coast.

(*b*) Fishing craft, including whalers, on board of which wireless telegraphy must be carried, are not obliged to keep a continuous watch.

(*c*) The continuous watch above referred to must be carried out by two or more first-class qualified telegraphists, as provided for in Article X. of the Regulations annexed to the Convention.

Art. 9.—Any ship which must carry wireless and which is classified in the first or second class must have an emergency installation, in accordance with Article XI. of the Regulations annexed to the Radiotelegraphic Convention.

In every case, the emergency installation shall be placed in its entirety on the upper deck of the ship and should be located as high up as possible.

The emergency installation must have a source of energy of its own, must be of such a nature that it can be set in motion very rapidly, and must be capable to work for a minimum of six continuous hours and possess a range of 150 kilometres.

This emergency installation is not required in the case of those ships whose *normal* installations fulfil all the requirements demanded by this Article (as enumerated in the preceding clause).

The licence referred to in Article IX. of the Regulations annexed to the International Radiotelegraphic Convention cannot be granted if the installation fails to comply with the requirements demanded by the said Convention and by the present Regulations.

Art. 10.—All points raised in the Radiotelegraphic International Convention and its Regulations which affect ship stations, the transmission of messages, and the issue of certificates to wireless operators, are governed by the following :—

(1) The Rules laid down in the above-mentioned Convention and its Regulations, as well as all the amending Regulations which may from time to time be substituted for them.

(2) The present Regulations whenever their provisions can be considered as additions to the above.

Sub-section 9.

Rules for Wireless Installations on National Merchantmen.

Art. 1.—All Shipping Companies whose vessels are included in the Regulations laid down in Wireless Law No. 9127 must obtain a permit from the Ministry of Marine and through the Prefect-General of Ports for the installation of wireless stations on their ships.

Art. 2.—Wireless stations on national ships devoted to the conveyance of passengers will be classified as belonging to the first class, and wireless stations on cargo boats will be included in the second class (Article XIII. of the Service Regulations annexed to the Wireless Convention).

When Shipping Companies apply for permission to install wireless in their vessels they must indicate the class occupied by such vessels, and this classification must be verified by the Office of the Prefect-General of Ports before forwarding the application to the Secretary-General of the Ministry of Marine.

Art. 3.—As soon as the permit has been granted, and immediately after the stations have been erected on the ship, the company must notify the Prefect-General of Ports, so that the latter may—after previous inspection by the wireless inspector—issue the corresponding licence through the Chief of the Maritime Wireless Service. This licence will be handed over as soon as the charge of 5 pesos (national currency) for the defrayment of expenses has been paid.

Art. 4.—The Ministry of Marine will grant the licence :—

(*a*) If the wireless installation fulfils all the requirements of the law in the matter of range and also if the installation belongs to a system permitting of its being tuned to the wave-lengths specified in the London Wireless Convention, within an approximation of 5 per cent.

(*b*) If a deposit to the order of the Director-General of Posts and Telegraphs has been made in the "Banco de la Nación Argentina" of the amount previously fixed by this office as a guarantee for the exchange of radiograms. This deposit must amount at least to one hundred pesos, national currency.

(*c*) The depositors shall not dispose of the deposit (as provided in (*b*)) unless they previously notify the administration that their vessels are going to discontinue their registered service, and that sufficient time has elapsed to effect the final liquidation of accounts for radiograms exchanged.

(*d*) Stations on board ships from a country with which no agreements have been entered into for the exchange of radiograms (between our stations and its ships), will be subject to the conditions (*b*) and (*c*). In this case the deposit must be made, before any service is rendered, by the agents of the shipping company owning the vessel.

Art. 5.—Wireless installations on ships belonging to the national merchant service must be furnished with the following papers :—

(1) The licence authorising the installation

(2) One copy of the London Wireless Convention.

(3) One copy of the Wireless Law.

(4) One copy of the Wireless Regulations.

(5) The Official List of Wireless Stations, and alphabetical list of call letters.

(6) Radiogram forms.

(7) One copy of the standing wireless rates, which must be kept where it can be plainly seen.

(8) One slate, placed outside the wireless cabin, so that the names of those stations within range may be noted thereon for the information of the public.

Art. 6.—The stations on board national merchantmen must be disposed in such a way that the State's stations may receive the waves emitted by the former.

Art. 7.—Radiotelegraphists are forbidden to operate in unlicensed stations.

It is their duty to report to the Prefect-General of Ports any tentative to compel them to disregard this prohibition.

Art. 8.—(*a*) When a "licence" is issued the station receives its call letters, which will be published in the Official List of Radiotelegraphic Stations issued by the Berne International Telegraphic Bureau.

Stations licensed for public service "must not use," not even for private purposes, other call letters than those assigned them by the Director of the Maritime Public Radiotelegraphic Service.

(*b*) The operators in charge of the stations

will be responsible for any infringement of the above provision.

Art. 9.—(*a*) Operators in charge of public service stations are responsible to the Director of the Maritime Public Radiotelegraphic Service for the fulfilment of the provisions contained in the Regulations in force at the time and in the International Radiotelegraphic Convention.

The manager of a station is the chief of the staff serving in the same, and if it is a ship station the manager is responsible to the ship's captain.

The operator in charge of a ship station owes obedience to the captain, and if the latter gives an order against the rules or the International Convention, the operator has the right, acting with tact and courtesy, to call the captain's attention to the fact, pointing out to him at the same time how to avoid the infringement of the rules in carrying through the order received.

(*b*) The operator in charge shall keep a "book of orders of the station," the pages of which must be numbered. It is forbidden to detach leaves from this book and to use erasers on its pages.

A record will be kept in this book of all orders received from officers with authority to issue them, such as the ship's captain, his substitute, the inspectors representing a Prefect of Ports, etc. Every order will be marked with a number, and in a marginal note the operator will state the date and hour in which it was received; also the place, whenever possible.

The book of orders will be considered as an official document jointly with the "watch book" (*libro de guardia*). The two books will be referred to in case of a lawsuit originated from infringement of the regulations or through other causes.

Whenever required by a competent authority this book shall be submitted for inspection.

Opposite the order (to this effect), in a marginal note, the operator will record the date and hour in which he complied with it.

(*c*) The operator in charge is responsible for the "service" of the station; therefore, he must see to it that all measures are taken to insure the most efficient service the class of the station calls for—as given in the licence issued by the Director of the Maritime Public Radiotelegraphic Service.

(*d*) Only the operator in charge is responsible for the accounts or bookkeeping of the station and, unless express orders to the contrary are given, he must prepare the balance-sheets and vouchers thereof.

Art. 10.—The operators in charge of a radiotelegraphic station where an emergency station has been installed according to specifications in the Convention, must verify the perfect running of the emergency station before weighing anchor. The experiments to be carried in this case will be purely local, being limited to the test of the generator, the oscillating circuit and the receiving apparatus.

However, if the operator in charge is in doubt as to the range or satisfactory running of the whole set, he may ask any coast station to listen to his call in order to perform any test he may judge necessary. When acting in this way the operator will use the abbreviations given in the international list.

The test will be carried through in this way: the operator will ask for a certain time (*un cierto tiempo*) the transmission of the signal • • •▬• in order to verify the receiving set: afterwards, the operator will send the same signal using the emergency transmitting apparatus, thus testing its efficiency and the wave-length.

The operator of the station will record in his "watch book" all the remarks suggested by the test and the result of same. If the emergency station is found deficient in some respect, the operator will report to the captain so that he may give the necessary orders to have it repaired and in working order, according to the International Convention.

Art. 11.—When a national merchant ship happens to enter a zone where naval manœuvres are being performed by men-of-war using their wireless, the merchant ship must ask for a licence from the chief of operations to send her messages to the land stations, and in so doing she must state the approximate time that will be required to transmit the traffic in hand.

In these communications both the man-of-war and the merchant ship will use the prefix "T.R."

Art. 12.—Whenever these Regulations are infringed information about the facts will be gathered, and in view of the evidence fines will be imposed, according to the national and international laws and regulations governing the telegraphic and radiotelegraphic services. The payment of the fines will not prevent further legal action, as may be required by the nature of the fault.

A "licence" may be cancelled if the findings in the summary show the convenience of so doing.

Sub-section 10.

Official Classification, Rates, Collections, and Accounts in all Kinds of Radiotelegraphic Stations.

Art. 1.—To make up and liquidate the accounts concerning radiograms received from the public at the coast stations, the following method will be observed:

(*a*) If there is no postal or telegraph office in the locality, the money corresponding to this service will be paid to the Post and Telegraphs Treasury through the Administrative Section under the Director-General of the Ministry of Marine.

(*b*) If there is a postal or telegraph office in town, the payments referred to in (*a*) will be made to it, daily, the wireless coast station getting a receipt for every remittance.

(*c*) In places where there is a telegraph office, the coast station shall receive messages from the public when the former is out of connection with the telegram system, and the tolls collected will be paid by the latter to the telegraph office, as stated in (*b*).

Art. 2.—Radiograms from the personnel of the national Navy and ships belonging to other State services will be exempted of the tolls caused at the State ship and coast stations, but not of those corresponding to the land lines.

When such radiograms as those referred to in this article do not use land lines, their transmission will be charged according to the lowest (*simple*) telegraphic rates.

Art. 3.—The personnel of the Navy shall be able to make use, without charge, of radiotelegraphy for affairs of service connected with their functions, providing that the interchange is effected directly between stations of the Navy and without the intervention of any other system of communication. This class of radiotelegram shall bear the prefix "R.S.," and will not be forwarded without the sanction o

the officer in command. As regards transmission, they will take priority over the "D.P." radios.

ART. 4.—The collection of tolls on private radiograms from ships of the Navy or other public services is subject to the following rules:—

(*a*) Radiograms from the personnel mentioned in Art. 2 and those addressed to any of the national wireless stations to be forwarded by land lines to men in the service, are subject to the ordinary telegraph rates and the amount in full must be paid to the operator or chief of the station, just as telegraphic messages are paid for in land offices. The operator will issue in every instance a receipt of the amount collected.

(*b*) Every day the operator in charge will hand over to the ship's purser the money received for private messages sent out, and the purser will give a receipt of the amount.

(*c*) The pursers of ships stationed between La Plata and the Buenos Aires ports will pay out every month to the Arsenal Administrative Department the money received from the operators in charge. This payment to be made according to paragraph (*a*), Art. 1 of this Sub-section.

(*d*) The same operation will take effect every month in the arsenal and ships anchored in the military port, where the Administrative Department will hand over the money received directly to the Telegraph office at that port.

(*e*) In the case of ships out at sea, the deliveries of money will take place as stated in paragraphs (*c*) and (*d*), the payments to be made within twenty-four hours of arrival at their jurisdictional port, if such arrival occurs after the day fixed for settlement of accounts.

ART. 5.—Any claim arisen from differences in the accounts submitted will be presented by the Director-General of National Posts and Telegraphs to the Chief of the Maritime Public Radiotelegraphic Service.

ART. 6.—Ships and service sections with wireless stations belonging to Ministries (other than the Interior and Marine) will settle the radiotelegraphic accounts according to agreements they will enter into with the Director-General of Posts and Telegraphs.

ART. 7.—Shipping companies will settle monthly their accounts with the Administration of Posts and Telegraphs. The settlement will be made according to the statement of account that the latter office will prepare and forward to every shipping company.

ART. 8.—Telegraph and radiotelegraph rates at present in force are those published in the pamphlet "National Postal and Telegraphic Schedule of Charges" 1917 edition, and in the "Official List" of International Radiotelegraphic Stations.

National stations will apply the rates therein given.

ART. 9.—With the amount of tolls collected in the public service by the State's and National Shipping Companies' stations (which amounts are paid to the Administration of Posts and Telegraphs as provided in these Regulations) the following documents will be submitted: the list of radiograms exchanged with the necessary information to identify them, and the original of every message sent, relayed and received.

These originals will be placed in a sealed envelope, to be opened only by the Administration of Posts and Telegraphs.

ART. 10.—One copy of the list (mentioned in Art. 9) shall be sent in the first five days of every month to the Radiotelegraphic Department, Ministry of Marine. Shipping companies' stations shall forward these lists through the office of the Prefect-General of Ports.

ART. 11.—A separate list will be made of the official radiograms exchanged between the Navy units and between these units and the national coast stations, when the last is their final destination. This list will be sent only to the Radiotelegraphic Department, also in the first five days of every month, and must be accompanied by the originals of the radiograms exchanged (received, relayed and transmitted) as provided by Art. 9.

ART. 12.—Coast and ship tolls will be liquidated between the Director-General of Posts and Telegraphs and the foreign administrations or companies controlling the stations intervening in the exchange of radiograms, according to Art. XIII. of International Radiotelegraphic Regulations.

ART. 13.—The tolls collected on account of public service radiotelegrams exchanged direct between ships owned by the same company shall not be paid to the Administration of Posts and Telegraphs, but the corresponding list of messages and their originals shall be supplied as provided above.

ART. 14.—The accounts for direct radiotelegraphic exchange between Argentine merchant ships or between Argentine and foreign ships will be settled between the respective companies, and to this effect in each case the receiving station will make the corresponding charge to the transmitting station, but the list of messages and the originals of the messages exchanged will be supplied by the stations on board national ships.

ART. 15.—The Director-General of Posts and Telegraphs shall include in the official list of telegraphic offices the data *re* national licensed coast and ship stations existing in the country, and the list will be kept for reference and consultation by the public at every telegraph office in the Republic. The necessary information to prepare this list—as detailed below—will be supplied by the Ministry of Marine to the Director of Posts and Telegraphs, viz.:—

(*a*) *Inland and Coast Stations.*—Name, geographical position as shown by the territorial sub-division of the country, and longitude and latitude of the place.

Ship Stations.—Name of the vessel, and—if essential—name of the owner or owners.

(*b*) Call letters. (Every group of call letters must contain three letters and shall be differently arranged for each station.)

(*c*) Normal range.

(*d*) Radiotelegraphic system employed and characteristics of the transmitting set.

(*e*) The several wave-lengths employed by the station. The normal wave-length to be underlined.

(*f*) Class of service rendered by the station (communication with ships, general public correspondence, private correspondence, long-distance public correspondence, special correspondence, exclusively official, etc.).

(*g*) Service hours of the station.

(*h*) The time and how the signals are sent out, and the meteorological notices, when the station attends to this kind of service.

(i) Coast and ship rates.

The list will contain, as well, the information communicated to the Berne Bureau relating to radiotelegraphic stations not opened for general public correspondence.

In designing radiotelegraphic stations, the following abbreviations will be made use of :—

PG—Station open to general public correspondence.

PR—Station open to restricted public correspondence.

P—Private station (*Estación de interés privado*).

O—Station open exclusively to official correspondence.

N—Permanent Service Station.

X—Station without fixed hours service.

In cases of homonymy, the name of a ship station will be immediately followed—in the first column of the list—by the corresponding call letters.

ART. 16.—In the counting of words to collect the tolls, the rules given in the regulations annexed to the Petrograd Convention will be followed.

ART. 17.—The originals of public service radiograms and all documents appertaining to same will be safely kept by the Direction-General of Posts and Telegraphs during fifteen months, counting from the month following that in which the originals were received at that office.

ART. 18.—Reimbursements originated by the exchange of radiograms with the State's stations will be settled in accordance with the provisions of the International Telegraphic and Radiotelegraphic Convention.

ART. 19.—In the application of the schedule of charges corresponding to messages issued from or addressed to radiotelegraphic stations established in places where no telegraph office is in existence, such stations will be considered as national telegraph offices and the radiotelegraphic rates will be applied only to messages exchanged with ship stations.

CHAPTER III.

NAVY RADIOTELEGRAPHIC STATIONS SERVICE.

SUB-SECTION I.

STATION'S STAFF—DUTIES AND POWERS.

ART. 1.—The staff in every station will consist of one operator in charge and the number of subordinate trained operators required to keep the watch. The number of these operators will be fixed by the Radiotelegraphic Department.

In case of vacancy or temporary absence from the station of the operator in charge, his place will be filled by the operator of highest category or, between men of the same category, by the senior in the service.

Operators in charge shall depend directly from the signal officers.

ART. 2.—The operator in charge is responsible to the Department or to the signal officers—as the case may be—both for the proper running and upkeep of the station apparatus and for any lack of attention in the performance of the service. The operator in charge, however, may have the responsibility devolved upon the subordinate who was in the watch at the time the breakdown or inattention took place.

ART. 3.—When the station is short-handed, the operator in charge will do watch duty as the subordinate, but the former will be at liberty to choose the hours for his watch.

ART. 4.—The hours of watch corresponding to each operator will be fixed beforehand, considering the class of service to be rendered and the number of men in the staff of the station.

ART. 5.—Ship commanders or managers of other public services have authority to increase temporarily the staff of the stations depending from them, when, on account of manœuvres or other similar service, they consider it essential to insure efficient communications.

ART. 6.—To define justly the responsibility attaching to each operator in connection with breakdowns in the apparatus or omissions in the fulfilment of duties, each operator on taking up his watch will sign in the watch book an entry stating the condition in which he receives the apparatus, the hour of his coming in and all other particulars that may help later on to establish responsibilities. This entry shall be signed also by the operator leaving the work.

ART. 7.—Every time a watch is relieved the operator going out will communicate to his relief all information in his possession concerning the service and useful in the proper performance of the duties.

ART. 8.—When, on account of atmospheric discharges, it is dangerous to keep the apparatus ready to work, the antenna shall be connected to earth, and this fact will be recorded in the watch book stating the hour in which the interruption took effect and that in which connection for work was re-established. During the period of interruption, the operator shall test the atmospheric conditions every thirty minutes, and he will reconnect the antenna immediately the discharges cease.

ART. 9.—The managers of special services and the commanders of ships shall see that the archives of radiotelegrams—official and private—are kept in due order and with all the information required; also the stub-book of receipts. To this effect the signal officer or the officer in charge of the bookkeeping will inspect the station with due frequency.

ART. 10.—The *Dársena Norte* station is the "Service Central Station," and upon its call the other stations shall stop their communications unless the messages are *very urgent*, in which case the transmission shall be carried on to the end. "Very urgent" messages are those asking for assistance and those transmitting orders from H.E. the President of the Republic, the Minister of Marine and the commanders of fleets engaged in manœuvres.

ART. 11.—Time service in force for coast and fixed ship stations is as follows :—

Station	Hours
Dársena Norte	Permanent (N
Rio Santiago	
Faro Recalada (*Recalada Lighthouse*)	9–11 m.; 2–4 s. 8–12 s.
Pontón estacionario de Prácticos (*Stationary Pilots' Pontoon*)	,, ,,
Faro Mogotes (*Mogotes Lighthouse*)	Permanent (N
Puerto Militar (*Military Port*)	,, ,,
Comodoro Rivadavia ..	,, ,,
Cabo Virgenes	,, ,,
Año Nuevo	6 s.–6 m.
Rio Grande	6 m.–6 s.
Ushuaia	Permanent (N

La Paz	12 m.–12 s.
Posadas	,, ,,
Formosa	,, ,,
Puerto Aguirre	,, ,,
San Julian	Permanent (N)

ART. 12.—Commanders of ships navigating along or towards Argentine coasts will have observed on their "R.T." stations the following hours:—

Ships with three or more radio-telegraph operators	Permanent service.
Ships with two operators ..	7 m.–11 m.
,, ,, ,, ...	2 s.–6 s.
,, ,, ,, ...	8 s.–12 s.
Ships with one operator.. ..	8 m.–11 m.
,, ,, ,, ...	2 s.–4 s.
,, ,, ,, ...	9 s.–11 s.

Whenever a complaint is made, a full explanation as to the reasons of delay or other cause of complaint shall be given, and to this effect a record of the facts will be entered in a special Watch Book. This book will be kept by the operator in charge and viséed by the signal officer. Coast stations may call at any hour the ship they want to communicate with. In case of delay, the coast station will regulate its work so as to pick up the ship station at the first opportunity.

Ship commanders may call at any hour the permanent service stations, but, in normal circumstances, they should arrange their calls to other stations in accordance with the latter's hours of working.

Calls for assistance are to be made at any time they are required.

Stations with intermittent service shall attend an urgent call the moment it is heard, whether or not within their regular service hours.

For the purposes of this article the hour is that of the Córdoba meridian.

SUB-SECTION 2.

GENERAL RULES.

ART. 1.—It is absolutely forbidden to the operators to maintain dialogues by wireless; their conversations will, in every instance, be limited to the subjects strictly essential to render a good service.

ART. 2.—Whenever a radiogram is transmitted with a delay of more than thirty minutes after it was handed in, it shall be endorsed with an explanation of the delay which is to be recorded in the watch book.

ART. 3.—When a station calls repeatedly for another and cannot get an answer in more than five minutes, the fact will be recorded in the watch book and also the object of the call. Other stations within the range of the calling station shall record, as well, the call and the omission to answer it. These records will serve to establish the responsibility for possible delays in the transmission or reception of messages.

ART. 4.—When a station "causes a wait" (*da una espera*) of more than ten minutes, the two stations concerned shall record the fact in their respective watch books, the transmitting station giving the classification of the radiogram it has for transmission, and the receiving station the cause of the "wait."

The transmitting station shall remind every ten minutes the receiving station of its being waiting, and the reminders will continue until the radiogram in hand is transmitted.

ART. 5.—Whenever trouble occurs in the receiving apparatus causing a delay of more than ten minutes, a record of the nature of the trouble will be made in the watch book in order to fix responsibilities. The operator in charge will make a similar record whenever he is unable to answer a call through lack of current in the transmitting set, the burning out of a fuse, or other like accident.

ART. 6.—While two stations are in communication, it is absolutely forbidden to the others to interrupt them by calling out a third station, unless the call is to transmit a "very urgent" radiogram or a "general call" from the flagship. However, even in the cases just mentioned the interruption should be made only at the moment the station that is sending messages completes one of them. When this is accomplished the interrupting station shall give the signal of general interruption and the prefix corrésponding to either of the very urgent messages above mentioned, which are to have priority in transmission and reception.

ART. 7.—When a ship moors at a port, Navy yard or dockyard, her wireless plant will be closed after a thorough cleaning of its parts.

ART. 8.—To avoid the damages which are likely to occur in wireless stations of resonant spark, on account of the spark gaps being short circuited, the electrodes shall be thoroughly cleaned once a week.

The officer on duty shall be present at the cleaning and will see that it is made properly and thoroughly. To ascertain that the operation has been carried through without impairing the efficiency of the apparatus, the officer will remove the mica washers and will see whether—without them—the contact between each pair of electrodes is perfectly uniform both in the copper rings and the silver discs.

ART. 9.—Radiograms referring to urgent family matters of men in the Navy service, and issued from a Navy ship to Dársena Norte station, may be sent thence to destination by telephone, if the sender so desires. This will not alter the charges provided the expression "T.C. Naval" follows the signature.

ART. 10.—Arsenal and dockyard commanders shall take care that the radiotelegraph operators under their command attend in the most thorough manner to the cleaning and maintenance in good order of wireless apparatus on board ships anchored therein. The same commanders will see to it that the operators practise with reasonable frequency in sending and receiving messages.

ART. 11.—It is the duty of the staff of a ship station anchored in a Navy yard or military zone to serve in the land stations in the neighbourhood. If one of the latter is closed for repairs, the operators shall report for duty at the station on board the ship appointed to replace the temporarily closed station.

When the number of available operators is rather large, the commander of the Navy yard or the military zone will appoint the hours of service corresponding to each operator.

ART. 12.—Complaints referring to misdirected, altered or delayed radiograms should be forwarded by the sender of the message to the captain of the ship whence it was transmitted.

The complaint must contain the number of the radiogram, the hour of transmission, the receiving station and the name and address of the addressee.

The ship commander will give the necessary instructions to have the information supplied duly checked and all the papers referring to

the case shall be sent to the Secretary-General of the Ministry.

Every complaint must refer to one radiogram only.

SUB-SECTION 3.

SPECIAL BOOK-KEEPING OF THE NAVY STATIONS.

ART. 1.—All coast and ship stations shall forward to the Radiotelegraphic Department, Ministry of Marine, in the first five days of every month, two copies of the sheets showing the monthly traffic of both official and public radiograms.

The same stations shall forward, every quarter, a statement of the supplies spent and a requisition of the supplies wanted.

ART. 2.—As often there are divergencies in the international radiotelegraphic service as to the number of words contained in the radiograms sent and received abroad through stations in national men-of-war, these ships shall forward to the Radiotelegraphic Department, Ministry of Marine, an authenticated copy of every message exchanged between them and foreign stations.

Such copies shall be forwarded immediately after the arrival of ships in home waters, so that the Department will be in advance in a position to answer the Administration of Posts and Telegraphs consultations on this subject.

ART. 3.—In all matters relating to management and book-keeping, independent radiotelegraphic stations shall address direct to the Radiotelegraphic Department.

DECREE NO. 1 OF OCTOBER 13, 1919.

Buenos Aires, October 13th, 1919.

The Executive Power of the Nation decrees:

ART. 1.—All restrictions imposed having reference to the use of radiotelegraph installations on merchant vessels are removed.

ART. 2.—Merchant vessels shall not make use of their transmitting apparatus on entering the zone comprised within a radius of five nautical miles of the radiotelegraph stations open to public service, and during such period as they remain in that zone. Nevertheless they shall be able to use their transmitters in case of urgent necessity to make calls for assistance.

ART. 3.—A final period of six months is granted for Argentine merchant vessels to comply with the conditions stipulated by the General Regulations of the Radiotelegraph Service.

ART. 4.—At the General Prefecture of Ports an Office of Radiotelegraph Inspection shall be brought into operation which will see that merchant vessels comply with the stipulations of the International Radiotelegraph Convention of London and the General Regulations as regards the Radiotelegraph Service.

ART. 5.—This decree to be communicated, published, etc., etc.,

(Sd.) IRIGOYEN, JULIO MORENO.

DECREE NO. 2 OF OCTOBER 13, 1919.

Buenos Aires, October 13th, 1919.

The Executive Power of the Nation decrees:

ART. 1.—Authorises the "División Servicio Radiotelegrafico" to arrange for the Radiotelegraph Works of the Navy to carry out, on board merchant vessels entering the ports, all work that may be required by the radiotelegraph stations of those vessels.

ART. 2.—On the termination of the work the amount incurred as regards wages and materials with an additional charge of 10 per cent. as compensation for the use of machinery and costs of administration shall be liquidated, the amount in question to be paid by the captain or shipowner before the vessel leaves the port.

ART. 3.—The sums collected in this manner shall be paid over by the "División Servicio Radiotelegrafico" to the Treasury of the General Administrative Authorities, so that in due course they may be paid to the General Treasury of the Nation and credit granted for the items destined for the radiotelegraph stations of the Navy.

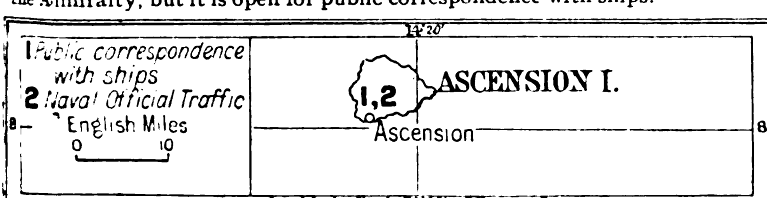
ART. 4.—The Radiotelegraph Inspectorate of the General Prefecture of Ports shall make this Decree known to captains and shipowners.

ART. 5.—This decree to be communicated, published, etc., etc.,

(Sd.) IRIGOYEN, JULIO MORENO.

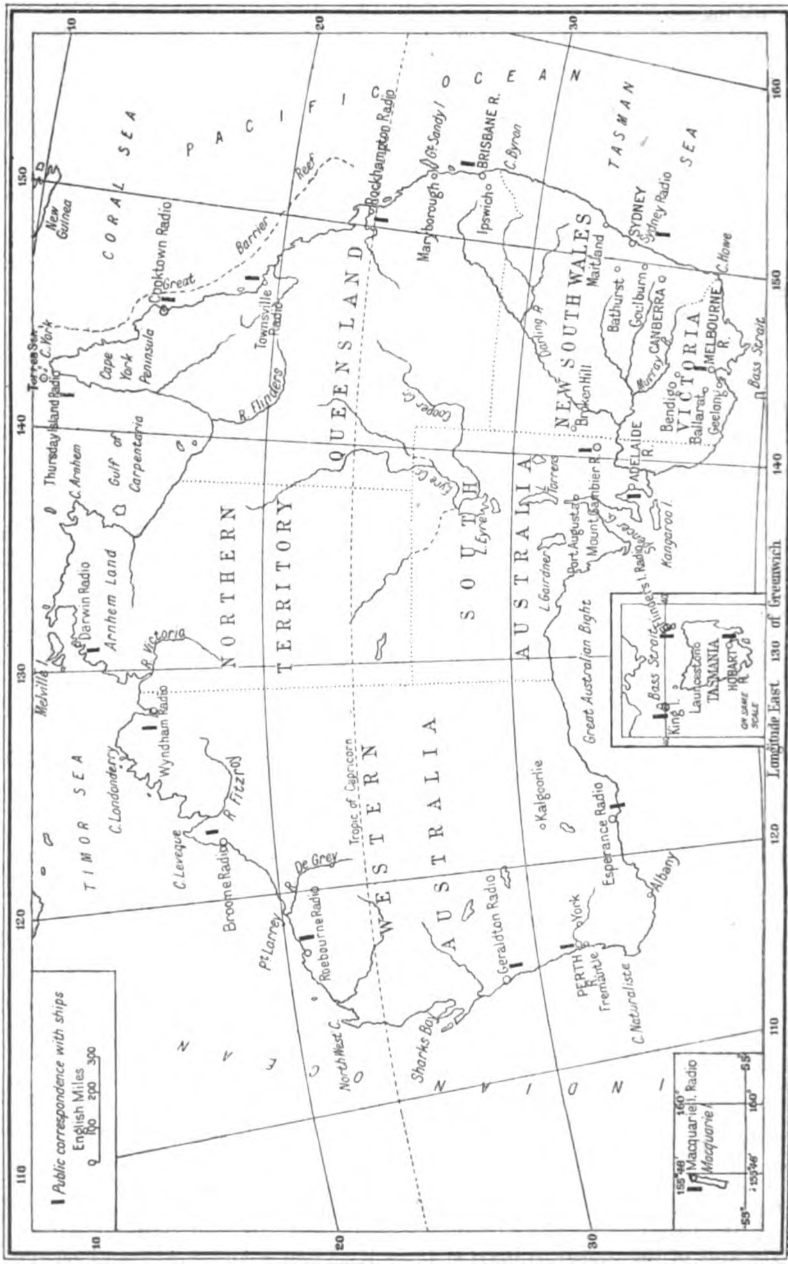
ASCENSION ISLAND

THIS isolated island lies, at its nearest point, about 900 miles from the mainland of Africa (Liberia) and possesses something less than 200 inhabitants. The wireless telegraph station belongs to, and is worked by, the Admiralty, but it is open for public correspondence with ships.



AUSTRALIA

THE territory of the Commonwealth includes the continent of Australia, the island of Tasmania, and part of the island of New Guinea (Papua). The area of the continent itself is 2,948,366 English square miles, whilst the


PACIFIC OCEAN
CORAL SEA
TASMAN SEA
TIMOR SEA
INDIAN OCEAN
New Guinea
Torres Str.
C. York
Thursday Island Radio
Cape York Peninsula
Gulf of Carpentaria
C. Arnhem
Arnhem Land
Darwin Radio
Melville I.
R. Victoria
Wyndham Radio
C. Londonderry
R. Fitzroy
C. Leveque
Broome Radio
De Grey
Pt. Larrey
Roebourne Radio
North West C.
Sharks Bay
Geraldton Radio
PERTH R.
Fremantle
York
C. Naturaliste
Albany
Esperance Radio
Kalgoorlie
Great Australian Bight
Tropic of Capricorn
NORTHERN TERRITORY
WESTERN AUSTRALIA
SOUTH AUSTRALIA
QUEENSLAND
NEW SOUTH WALES
VICTORIA
Cooktown Radio
Great Barrier Reef
Townsville Radio
R. Flinders
Rockhampton Radio
Maryborough
Gt. Sandy I.
BRISBANE R.
Ipswich
C. Byron
Cooper Cr.
Eyre Cr.
L. Eyre
L. Torrens
L. Gairdner
Port Augusta
Mount Gambier R.
Flinders I. Radio
Kangaroo I.
ADELAIDE R.
Broken Hill
Darling R.
Murray
Bathurst
Goulburn
CANBERRA
Maitland
SYDNEY
Sydney Radio
C. Howe
MELBOURNE R.
Bendigo
Ballarat
Geelong
Bass Strait
King I.
Launceston
TASMANIA
HOBART R.
ON SAME SCALE
Macquarie I. Radio
Macquarie I.
Public correspondence with ships
English Miles
0 100 200 300
Longitude East 130 of Greenwich
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inclusion of the island of Tasmania, which possesses an area of 26,215 square miles, brings the gross superficies to a total of 2,974,581 square miles.

The Government is a Federal Commonwealth Government—the Executive power vested in the Sovereign (acting through the Governor-General), assisted by the Executive Council of seven Ministers of State and such honorary Ministers as may be appointed thereto. The constitution rests on the fundamental law of March 16th, 1898, ratified by the Imperial Parliament on July 9th, 1900, and the Commonwealth was inaugurated January 1st, 1901.

CONTROL.

Originally radiotelegraphy was organised in Australia under the supervision of the Postmaster-General, the Naval Department exercising jurisdiction independently over their own radiotelegraph stations. In 1915 this duplication was abolished; the control throughout the entire Commonwealth being definitely placed in the hands of the Naval Authorities. The first sets erected were those at Point Lonsdale, in Victoria, and that near Devonport, Tasmania. Both of them date from 1905.

The land stations controlled by the Government are 21 in number, being those of Hobart, King Island, Flinders Island, Melbourne, Sydney, Brisbane, Rockhampton, Townsville, Cooktown, Thursday Island, Port Moresby, Darwin, Wyndham, Broome, Roebourne, Geraldton, Perth, Esperance, Adelaide, Mount Gambier, and Samarai.

There are no private land stations and no experimental stations.

There are a number of ship stations on Government vessels as well as on vessels privately owned.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Rt. Hon. Sir Joseph Cook, G.C.M.G.	Minister of the Navy	Sydney
F. G. Cresswell, R.A.N.	Acting Director of Radiotelegraphic Service	Sydney
A. F. Newman, R.A.N.	His principal Assistants	
G. I. Weston, R.A.N.		
W. T. S. Crawford		
F. G. Cresswell, R.A.N.	Chief Engineer (Wireless Section)	Sydney
C. B. Cutler	His principal Assistants	
A. S. McDonald		
F. J. Henderson		
S. Rolls		

ADMINISTRATION.

The Act to Regulate Radiotelegraphy in Australasia was passed in 1905, and appears *in extenso* in The Wireless Year Book for 1913, page 118. A number of additions and modifications were introduced by the Wireless Telegraphy Act No. 33 of 1915, and this amended text will be found below, it being the extant Governing Decree under which wireless is at present administered.

The licences issued to the various classes of individuals and corporations follow the same lines as those utilised in the Mother Country (see under Great Britain), and it is not, therefore, thought necessary to reprint them here. In 1912 the Commonwealth Parliament passed the Navigation Act, wherein is contained a clause which makes it compulsory for ships trading in Australian waters to be fitted with radiotelegraphic apparatus. This is provided for in Section 231 of the Act, and the text of that section will be found below with other information in accordance with the following list.

We append the text of current radiotelegraphic legislation in accordance with the following list. The form of Licence set out in the schedule to the Regulations below ("B") is similar to that used by the British Post Office. (See Great Britain.)

A—Wireless Telegraph Act, 1905 (No. 8), as amended by No. 33 of 1915.
B—Wireless Telegraph Regulations, 1916.
C—Navigation Act, 1912 (Sec. 231).
D—Temporary Permit for Wireless Experimenters.

ACT No. 8 OF 1905.

(As amended by the Wireless Telegraphy Act, No. 33 of 1915).

A 1. *Short Title.*—This Act may be cited as the Wireless Telegraphy Act, 1905.

2. *Interpretation.*—In this Act—

"Australia" includes the territorial waters of the Commonwealth and any territory of the Commonwealth;

"Wireless Telegraphy" includes all systems of transmitting and receiving telegraphic messages by means of electricity without a continuous metallic connection between the transmitter and the receiver.

3. *Exemption of Ships of War.*—This Act shall not apply to ships belonging to the King's Navy.

4. *Exclusive Privileges.*—The Minister for the time being administering the Act shall have the exclusive privilege of establishing, erecting, maintaining, and using stations and appliances for the purpose of—

(*a*) transmitting messages by wireless tellegraphy within Australia, and receiving messages so transmitted, and

(*b*) transmitting messages by wireless telegraphy from Australia to any place or ship outside Australia, and

(*c*) receiving in Australia messages transmitted by wireless telegraphy from any place or ship outside Australia.

5. *Licences.*—Licences to establish, erect, maintain, or use stations and appliances for the purpose of transmitting or receiving messages by means of wireless telegraphy may be granted by the Minister for the time being administering the Act for such terms and on such conditions and on payment of such fees as are prescribed.

6. *Penalty for Breach of Act.*—(1) Except as authorised by or under this Act, no person shall—

(*a*) establish, erect, maintain, or use any station or appliance for the purpose of transmitting or receiving messages by means of wireless telegraphy; or

(*b*) transmit or receive messages by wireless telegraphy.

Penalty: Five hundred pounds, or imprisonment with or without hard labour for a term not exceeding Five years.

Ships Fitted with Apparatus for Wireless Telegraphy.—(2) Sub-section (1) of this section shall not, except as prescribed, extend to appliances maintained on any ship, arriving from any place beyond Australia, for the purpose of enabling messages to be transmitted from or received on that ship by means of wireless telegraphy, but all such appliances shall, while the ship is within Australia—

(*a*) be subject to the control of the Minister for the time being administering the Act; and

(*b*) only be used by his authority or as authorised by the regulations.

Penalty: Five hundred pounds.

7. *Forfeiture of Appliances Unlawfully Erected.*—All appliances erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, shall be forfeited to the King for the use of the Commonwealth.

8. *Search Warrants for Appliances Unlawfully Erected.*—(1) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that any appliance is established, erected, maintained, or used in contravention of this Act or the regulations, for the purpose of transmitting or receiving messages by means of wireless telegraphy, he may grant a search warrant to any person.

(2) A search warrant under this section shall authorise the person to whom it is addressed to break and enter any place or ship, where the appliance is or is supposed to be, either by day or by night, and to seize all appliances which appear to him to be used or intended to be used for transmitting or receiving messages by means of wireless telegraphy.

9. *Proceedings in Respect of Offences.*—(1) Proceedings for any offence against this Act may be instituted in any Court of Summary Jurisdiction, and any person proceeded against under this section may be dealt with summarily or may be committed for trial.

(2) The Court in dealing summarily with any accused person under this section may, if he is found guilty of any offence against this Act, punish him by imprisonment with or without hard labour for any period not exceeding six months, or by a penalty not exceeding Fifty pounds.

10. *Regulations.* — The Governor-General may make regulations, not inconsistent with this Act, prescribing all matters which by this Act are required or permitted to be prescribed or which are necessary or convenient to be prescribed for carrying out or giving effect to this Act.

REGULATIONS AFFECTING WIRELESS TELEGRAPHY.

B 1. *Short Title.*—These Regulations may be cited as the "Wireless Telegraphy Regulations, 1916."

2. *Definitions.*—In these Regulations, unless the contrary intention appears—

"Australian ship" means a ship registered in Australia;

"British ship" means a British ship other than an Australian ship;

"Foreign ship" means a ship other than an Australian ship or a British ship;

"Harbour" includes any harbour properly so called, whether natural or artificial, or any estuary, navigable river, pier, jetty, or other work in or at which a ship can obtain shelter, or ship or unship goods or passengers;

"Land Station" means a station, not being a ship station, for the transmission and receipt of messages by means of wireless telegraphy.

"Ship Station" means a ship (not permanently moored) having installed thereon appliances for the transmission and receipt of messages by means of wireless telegraphy;

"Territorial Waters" means the territorial waters of the Commonwealth and those of any territory of the Commonwealth, and includes harbours;

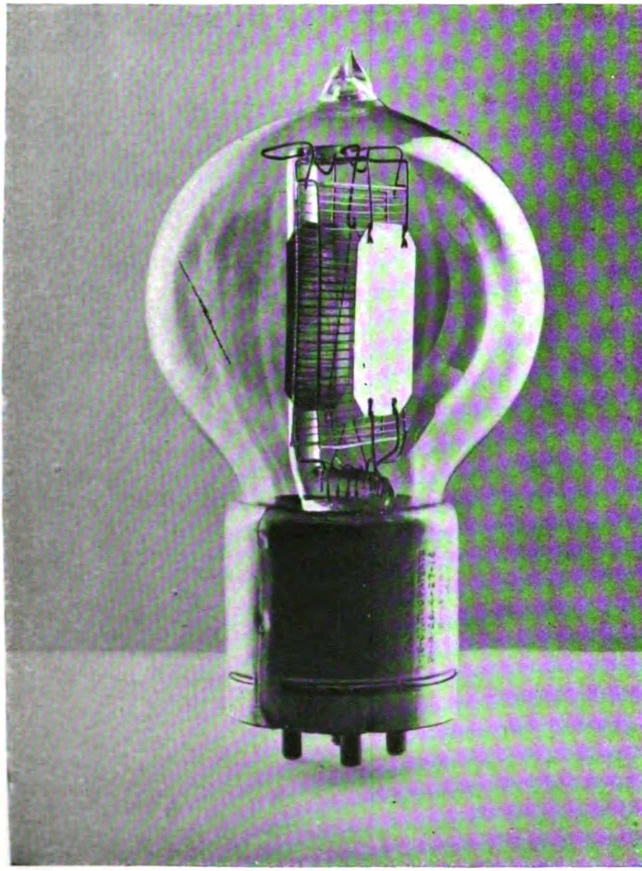
"The Act" means the *Wireless Telegraphy Act*, 1905–1915;

"The Minister" means "The Minister of State for the Navy";

"Naval Board" means the Naval Board of Administration appointed under the Naval Defence Act;

"Navy Secretary" means the Secretary to the Naval Board of Administration.

3. *Permits.*—(1) The Naval Board may, at their discretion, grant permission for technical schools and similar institutions to conduct experiments in Radiotelegraphy for the purpose of training students.



TYPICAL MODERN AMERICAN "HARD" THREE-ELECTRODE VALVE.

[To face page 96

(2) The applicant for such permission shall satisfy the Naval Board that the experiments will be conducted only for the purpose of training students, and shall furnish, with his application, a complete list of the material intended to be used, together with the name and credentials of the person who, it is proposed, will give the instruction.

(3) The applicant shall further agree to allow Inspectors attached to the Radio-telegraph Branch of the Department of the Navy free access to the premises in which the experiments are carried out, for the purpose of inspection, as and when required.

(4) The permission shall be granted without charge, but the Naval Board reserve the right to withdraw such permission at any time, and their decision in the matter shall be final.

4. *Licences.*—(1) A licence shall be granted only in respect of a ship station on an Australian ship.

( ) A licence shall be for a period of one year from the date thereof, but may be renewed from time to time.

5. *Fee for Licence.*—The fee for a licence shall be one pound, and shall be paid in advance.

6. *Application for a Licence.*—(1) An application for a licence must be in writing, and must set out the following particulars :—

(a) the name of the ship in respect of which the licence is applied for ;

(b) the port in Australia at which the ship is registered ; and

(c) the system of wireless telegraphy to be used on the ship.

(2) Before granting the licence the Minister may require the applicant to furnish such additional particulars as he thinks necessary.

7. *Condition as to Syntony, etc.*—Before any licence is granted the applicant must satisfy the Minister that the wireless telegraphy apparatus or appliances to be worked in pursuance of the licence complies with the Regulations for the time being in force governing syntony and wave length.

8. *Licence to be in Triplicate.*—(1) Every licence shall be made out in triplicate and two parts shall be issued to the licensee and the other retained in the Department of the Navy.

(2) Before the licence is issued to the applicant he shall execute the part of the licence to be retained in the Department.

9. *Renewal of a Licence.*—(1) A licence may be renewed by writing thereon or attaching thereto a memorandum stating the period for which it is renewed.

(2) The memorandum of renewal must be signed by the Minister or by the Naval Secretary.

(3) The renewal may be made at any time within one month before or one month after the expiry of the licence.

(4) The memorandum is to be written on each part of the licence, but in the case of the licensee's part it shall be in the form of a receipt for the renewal fee signed by the Minister or by the Naval Secretary, which receipt is to be attached by the licensee to his part.

10. *Revocation of Licence.*—The Minister may, by notice in writing, revoke and determine any licence, on the ground of the licensee having failed to comply with any Regulation for the time in force under the *Wireless Telegraphy Act*, 1905-1915, or on any other ground specified in the licence.

11. *Powers of Inspection.*—The Naval Board or any person authorised in writing by the Naval Board may at all reasonable times enter upon any ship station on which wireless telegraphy appliances are installed, or are in course of being installed, in pursuance of a licence, and may inspect such appliances and the working and user thereof.

12. *Communications between Ship and Land Stations.*—When communications are made by means of wireless telegraphy between a ship (whether British, foreign, or Australian) in territorial waters and a wireless telegraph station on land, the rules in force for the working of wireless telegraphy at that station shall be observed.

13. *Application of the Radiotelegraphic Convention and Regulations.*—The provisions of the Radiotelegraphic Convention and the Service Regulations for the time being in force thereunder, so far as such Convention and Regulations are applicable, shall apply to all wireless telegraphy installations available for the transmission or receipt of private messages, whether installed by the Commonwealth or under licence, and whether at land stations or ship stations and to all messages handled by such installations, and every licensee shal comply therewith.

14. *Appliances to be Worked so as to Avoid Interference with other Appliances.*—(1) The wireless telegraphy appliances on board any ship (whether an Australian ship, a British ship, or a foreign ship) in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(a) Naval or Military signalling ; or

(b) the transmission of messages between other wireless telegraph stations.

(2) In this Regulation Naval or Military signalling includes signalling or communicating by means of any system of wireless telegraphy, by the King's Imperial or Dominion Naval or Military Forces.

15. *Appliances not to be worked while Ship Moored to any Wharf or Pier.*—Except by permission of the Naval Board, the wireless telegraphy appliances on board any Australian ship, British ship, or foreign ship (other than a ship of war) shall not be worked or used while the ship is moored to any wharf or pier in Australia or any territory of the Commonwealth.

16. *Application of Defence Regulations to Foreign Ships of War in Harbours.*—The use of wireless telegraphy appliances, on board any foreign ship of war while in any harbour in Australia or any territory of the Commonwealth, shall be subject to such rules (whether prohibitive or regulative) as the Governor-General may think fit to make.

17. *Powers of Governor-General in Emergencies.*—If at any time an emergency has arisen in which it is expedient that the Commonwealth Government should have control over the transmission of all messages by wireless telegraphy, the Governor-General may by notice in the *Gazette* prohibit for such period as he thinks necessary the use of wireless telegraphy on board foreign ships in territorial waters.

18. *Control of Communications and Appliances in Emergencies.*—(1) In case of emergency the Naval Board or any officer in command of any ship of war of His Majesty's Navy (whether Imperial or Dominion), or any officer in command of any part of the Defence Force, may—

(a) take possession of any wireless telegraphy appliances installed on any ship

in pursuance of a licence, and use such appliances for the King's service; or

(*b*) place any person in control of any such appliances; or

(*c*) direct the licensee or person in charge of such appliances to submit to him all or any messages tendered for transmission or received by means of such appliances; or

(*d*) stop or delay or direct the licensee or person in charge of such appliances to stop or delay the transmission or delivery of any such messages or to deliver them to him; or

(*e*) direct the licensee or person in charge of such appliances to comply with all such directions as he thinks fit to give with reference to the transmission or receipt of messages by means of such appliances.

(2) Every licensee and every person in charge of any wireless telegraphy appliances installed in pursuance of a licence shall comply with this Regulation, and all directions issued in pursuance thereof.

(3) Reasonable compensation shall be payable to the licensee for any damage to the appliances arising in consequence of the exercise of the powers conferred by this Regulation.

(4) The Minister may, notwithstanding anything contained in a licence issued to a licensee under the Wireless Telegraphy Regulations, 1916, by order published in the *Gazette*, prohibit for such time as he directs any licensee from communicating with any radiotelegraph station licensed by, or belonging to, or in any country which is at war with His Majesty the King or the possessions thereof.

(5) Any order under sub-regulation (4) of this regulation may prohibit all communications whatever or may prohibit communications to particular stations or under special circumstances.

19. *Operators' Proficiency Certificates.*—(1) Every ship station in respect of which a licence is issued must be operated by a person or persons holding a certificate of competency or certificates of competency issued by the Naval Board after examination, or by the Postmaster-General of the United Kingdom or by the proper authority in any part of the British Empire.

(2) Certificates of competency shall only be issued to natural-born British subjects, and shall be of two classes—namely:

(*a*) 1st class—issued to persons over eighteen years of age capable of receiving and transmitting by sound at a speed which must not be less than twenty words per minute; and

(*b*) 2nd class—issued to persons over eighteen years of age capable of receiving and transmitting by sound at a speed which must not be less than twelve words per minute.

(3) A fee of ten shillings shall be paid by the candidate on each occasion on which such candidate is examined. A certificate of competency may be issued at a charge of five shillings to each candidate who satisfactorily passes the prescribed examination, and in the event of a certificate being lost a fee of ten shillings shall be paid for the first copy of such certificate, one pound for the second copy, and two pounds for any subsequent copies. In case of failure a candidate shall not be re-examined in any system or under any circumstances until after the lapse of three months.

20. *Use of Wireless Telegraphy for Military Purposes.*—These regulations shall not prevent the use, without licence, by the military authorities of wireless telegraphy for military purposes. Provided that each wireless telegraphy installation (other than a mere temporary installation) to be used shall be authorised in writing by the Naval Board.

21. *Charges.*—The total charges for messages transmitted and received for any duly authorised wireless station within the Commonwealth or licensed under the Wireless Telegraphy Act, 1905-1915, shall include:

(*a*) the coast charge which belongs to the coast station;

(*b*) the ship charge which belongs to the ship station;

(*c*) the charge for transmission over the lines of the telegraph system (where necessary); and

(*d*) delivery charges (where necessary).

22. *Rates.*—The rates for messages transmitted to or received from ship stations shall be as follows:

(1) For ordinary messages—

(*a*) Coast station transmitting or receiving charge—

(i.) Radiotelegrams to or from ships licensed in Australia or New Zealand, 3d. per word;

(ii.) Radiotelegrams to or from other ships, 6d. per word.

(*b*) Ship station transmitting or receiving charge—

(i.) Radiotelegrams to or from ships licensed in Australia or New Zealand, 2d. per word;

(ii.) Radiotelegrams to or from other ships, not exceeding 4d. per word.

(*c*) Land line charge, 1d. per word.

(2) For press messages—

(*a*) Coast station transmitting or receiving charge, 1½d. per word.

(*b*) Ship station transmitting or receiving charge—Not exceeding 4d. per word, as determined by the ship authorities concerned;

(*c*) Land line charge, ½d. per word, odd fractions of 1d. to be reckoned as 1d.

(3) For messages to or from ships of the British or Australian Navies—

(*a*) For official messages—

(i.) There shall be no coast station charge.

(ii.) There shall be no ship station charge.

(iii.) Land line charge, 1d. per word.

(*b*) For private messages, the rates and conditions shown in sub-regulation (1) of this regulation shall apply.

(4) For messages consisting of reports to Lloyd's agents concerning marine casualties and overdue vessels—

(*a*) Coast station charge, 6d. per word.

(*b*) Land line charge, 1d. per word.

The charges for these messages shall be collected from the addressee.

(5) The charge for relaying radiotelegrams, irrespective of the number of coast stations concerned in the relaying, shall be—

(*a*) When the ships of origin and of destination are both licensed in Australia or New Zealand, 4d. per word;

(*b*) When only one of the ships concerned or when neither of the ships concerned is licensed in Australia or New Zealand, 7d. per word.

23. (1) The rates for messages exchanged between stations established on the Australian

mainland or in Tasmania and stations established on islands within the Commonwealth Administration or between any stations established on such islands, except Flinders Island and King Island, shall be—

(*a*) For ordinary messages 1d. per word per radio station involved, plus ordinary land line charges for telegrams within the Commonwealth.

(*b*) For press messages (per station involved)—

	s.	d.
Not exceeding 25 words	1	3
Exceeding 25, but not exceeding 50	2	6
Exceeding 50, but not exceeding 100	5	0
Every additional 50 words or portion of 50 words	2	6

plus ordinary land line charges for press telegrams within the Commonwealth.

(2) The rates for messages exchanged between stations established on the Australian mainland or in Tasmania and stations established on King and Flinders Islands shall be—

(*a*) For ordinary messages ½d. per word per radio station involved, with a minimum of 1s. per message, plus ordinary land line charges for telegrams within the Commonwealth;

(*b*) For press messages (per station involved)—

	s.	d.
Not exceeding 25 words	0	7½
Exceeding 25 but not exceeding 50 words	1	3
Exceeding 50 but not exceeding 100 words	2	6
Every additional 50 words or portion of 50 words	1	3

plus ordinary land line charges for press telegrams within the Commonwealth.

(3) For messages exchanged between stations established on the Australian mainland or in Tasmania at times when the local telegraph offices are closed, the rates shall be 1d. per word plus the ordinary land line charges for telegrams within the Commonwealth, for such land line handling as is involved

(4) For press messages exchanged between stations established on the Australian mainland or in Tasmania at times when the local telegraph offices are closed, the rates shall be 1d. per word plus the ordinary land line charges for press telegrams within the Commonwealth, for such land line handling as is involved.

(5) The rates for the radiotelegraphic transmission of deferred and week-end telegrams shall be one-half and one-quarter of the ordinary rates respectively.

(6) Delivery charges, if any, shall in all cases be paid by the addressee.

24. (1) Radiotelegrams conveying Christmas or New Year greetings may be lodged at any telegraph office in the Commonwealth for transmission to New Zealand or to vessels registered in Australia or New Zealand. In addition to the address and signature, such radiotelegrams may contain a text consisting of any one of the following phrases:

(*a*) "Christmas greetings."
(*b*) "New Year greetings."
(*c*) "Compliments of the season."

(2) The total charge for such radiotelegrams shall be:

(*a*) For those addressed to New Zealand, 4s.

(*b*) For those addressed to vessels registered in Australia or New Zealand, 3s.

(3) Radiotelegrams containing the text "Christmas greetings" must be lodged on or before December 23rd, and those containing the text "New Year's greetings" or "Compliments of the season" must be lodged on or before December 28th.

25. The total charge for messages transmitted to or from ships shall be paid by the sender.

26. *Press Radiotelegrams for Publication on Ships.*—(1) Press radiotelegrams for publication on ships shall be addressed to the commander of a ship, or to a newspaper published on board a ship, and shall bear in the address the words "for publication," which words shall be charged for at press rates.

(2) The information contained in such press radiotelegrams must either be published in a ship's newspaper or posted on a ship's public notice board.

(3) Press radiotelegrams shall, subject to this regulation, comply with the provisions of Articles 65 and 66 of the detailed regulations attached to the International Telegraph Convention.

27. *Refunds.*—The full charge for a radiotelegram will be refunded when such radiotelegram is rendered useless through a fault of the telegraph service, and the full charge, less land-line charges, will be refunded when a radiotelegram cannot be delivered on account of the ship of destination having passed out of range.

28. *Transmission of Shipping Intelligence by Telephone.*—Information received at a coast station from vessels at sea, indicating the noon or midnight position, will be communicated by telephone to the owners or agents of such vessels on payment of 1s. per communication.

29. *Ocean Forecasts and Weather Reports.*—Ocean forecasts sent by the Commonwealth Meteorologist will be transmitted from radiotelegraph stations owned, operated, and maintained by or on behalf of the Minister to vessels at sea, and weather reports received at such radiotelegraph stations from vessels at sea, and addressed to the Commonwealth Meteorologist, will be transmitted, on payment of the following charges:

For each communication not exceeding 20 words, 2s.; for each additional word, 1d.; plus 1d. per word land line charge.

30. *Repeal.*—All regulations previously made under the Wireless Telegraphy Act, 1905–1915, and in force at the commencement of these regulations, are hereby repealed save as to any right, privilege, or obligation acquired, accrued, or incurred thereunder.

NAVIGATION ACT.

The Commonwealth Parliament passed in 1912 a Navigation Act which contains a clause making it compulsory for ships trading in Australian waters to be equipped with apparatus for wireless telegraphy. This matter is dealt with in Section 231 of the Act, and the text of the section given below is as under:

EXTRACT FROM NEW NAVIGATION ACT, 1912.

Division VI.

231. (1) Except as prescribed, every foreign-going ship, Australian trade ship, or ship engaged in the coasting trade, carrying fifty or more persons, including passengers and crew, shall before going to sea from any port in Australia be equipped with an efficient

apparatus for wireless communication in good working order in charge of one or more persons holding prescribed certificates of skill in the use of such apparatus.

(2) For the purposes of this section apparatus for wireless communication shall not be deemed to be efficient unless:

(*a*) It is capable of transmitting and receiving messages over a distance of at least 100 miles, day and night.

(*b*) The person controlling the operator undertakes in writing to the Minister to exchange, and does, in fact, exchange, as far as may be physically practicable (of which the master shall be the judge) messages with shore or ship stations using similar or other systems of wireless communication; and

(*c*) There is provided, in connection with the apparatus, and ready for use whenever from any cause the ordinary supply of electrical power is not available, a battery of accumulators of such capacity as to insure for a period of at least six hours communication of the efficiency prescribed in paragraph (*a*) of this sub-section.

(3) The equipment shall, if so prescribed, nclude a silent chamber for the receipt of messages.

(4) The master of a ship required by this section or the regulations to be equipped with wireless telegraphy apparatus shall not take her to sea, and the owner of a ship required to be so equipped shall not permit her to go to sea, unless the requirements of this section have been complied with.

PENALTY: One Thousand Pounds.

(5) The regulations may prescribe the times and hours during which an operator shall be in attendance on the apparatus, ready to receive or transmit messages.

(6) Except as otherwise prescribed, the provisions of this section shall not apply to ships plying exclusively between ports in Australia less than two hundred miles apart.

(7) The Governor-General may make regulations in accordance with the provisions of any International Convention to which the United Kingdom is a party relating to the use of Wireless Telegraphy on ships, and such regulations may be in addition to, or in substitution either wholly or in part for the provisions of this section.

D TEMPORARY PERMIT TO USE W/T APPARATUS FOR PURPOSE OF RECEIVING WIRELESS TELEGRAPHY SIGNALS.

This Permit is issued pending legislation on the matter of the issue of licences to amateurs and others for experimental purposes, and is strictly limited to "receiving" stations. Permits for transmitting stations cannot be issued at present, except in special cases.

Unless specially endorsed, this permit does not extend to the use of "valves." Permission to use valves will be granted only to those who are certified W/T operators or furnish satisfactory evidence that they understand the principles of valve working and can receive W/T signals efficiently at a speed of not less than twelve words per minute.

This permit will lapse with the introduction of new Regulations governing the issue of licences for experimental and instructiona purposes, when the necessary forms of application for licence will be forwarded to the holders of permits.

Issued to ....

Address..................................

Telephone No. (if any) ....

F. G. CRESSWELL,
Radio Commander,
Acting Director of Radio Service.

N.B.—This permit is not transferable, and applies only to the premises above specified.

AUSTRIA

THE Republic of German-Austria forms only a very small part of the erstwhile Austro-Hungarian Monarchy, and conditions are not yet sufficiently settled for us to be able to do more than print here the Laws and Regulations governing wireless telegraphy in Austria as they existed prior to the outbreak of war.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Konrad Hoheisel ..	Director-General of Posts and Telegraphs ..	Vienna

ADMINISTRATION.

A—Decree of Ministry of Commerce, 7th January, 1910.

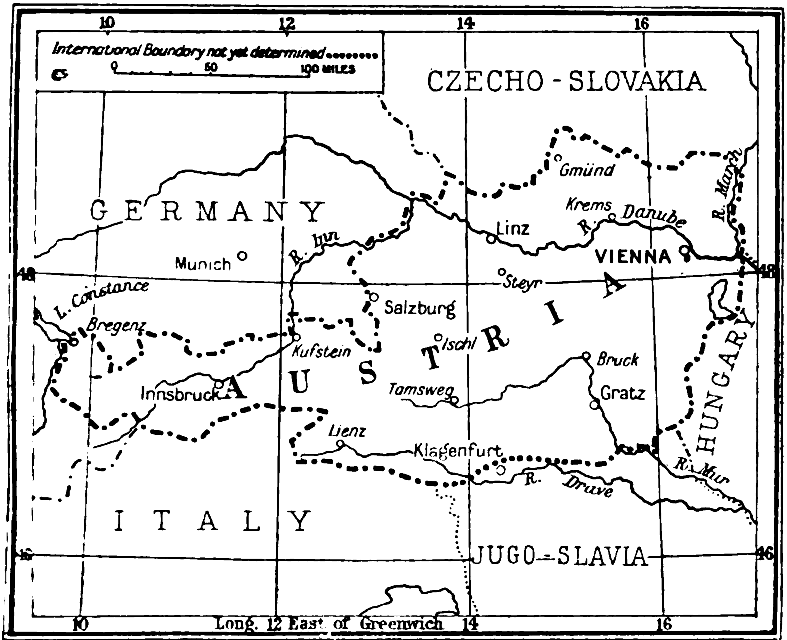
B—Document of Concession.

C—Decree of Ministry of Commerce, 8th November, 1910.

D—Special Regulation, Ministry of Commerce, 1st March, 1912.

E—Regulations (Ship Stations), 1st April, 1912.

F—Temporary Service Regulations—Operators.



A The following Decree of the Ministry of Commerce, dated January 7th, 1910, is concerned with wireless telegraph stations in the Austrian Empire, on board Austrian ships, and on ships of foreign nationality in Austrian territorial waters :—

(1) In accordance with a High Decree of Parliament of January 16th, 1847, and the Decree of the Ministry of Commerce, dated April 25th, 1905, the erection and working of Wireless Telegraph stations in the Austrian Empire and on Austrian ships is a State concession, to acquire which a written application (liable to Stamp Duty) containing a description of the station and a diagram of connections, must be submitted.

(2) The choice of system, apparatus, and fixtures, as well as the establishment of coast and land rates within the limits of the Wireless Telegraph agreement of 1909, and the supplemental regulations are the prerogative of the Ministry of Commerce.

(3) The general regulations for Wireless Telegraph stations on board ships are shown below.

(4) Wireless Telegraph stations on board ships must fulfil the following conditions :—

(a) They must be of equal technical efficiency to systems other than that adopted in the stations, and they must be able to inter-communicate with other systems.

(b) The system adopted must be one of "syntonisation."

(c) The speed of transmission and reception must not, under normal circumstances, be less than twelve words (each of five letters) per minute.

(d) The power possessed by the apparatus must not exceed, in normal conditions, 1 kilowatt. A greater power can be used when the ship is under an obligation to exchange messages at a longer distance than 300 kilometres from the nearest coast station, or when the transmission can only be effected by means of a higher power than specified.

(5) The working of Wireless Telegraph stations on board foreign ships in Austrian territorial waters is dependent upon the previous grant of a State concession. This regulation does not apply to warships or ships in distress. If a foreign vessel employs its Wireless Telegraph station without authorisation, the State authorities may take steps to prevent the working of the station in Austrian territorial waters.

Document of Concession.

B The Ministry of Commerce hereby grants to .... the concession for the installation and working of a wireless telegraph ship station on board the s.s. .... and reserves to itself the right to cancel same at any time. The concession is granted on the following conditions :—

(1) The Wireless Telegraph station must be erected according to the description in the application and according to the diagram of connections.

Supplemental changes in the technical installation which would have an effect upon the transmitting and receiving speed of the station cannot be undertaken without the consent of the Ministry of Commerce.

(2) The concessionnaire must pay an annual recognition fee of 20 Kronen for the station.

(3) The Telegraph Directorate is entitled

to empower their officials to examine the station and to control the working of the same.

Opportunity must be given to officials of the Austrian Navy, on their request, to make themselves acquainted with the working of the station apparatus.

Collusion in order to keep back details of the condition of the station from the official authorities is inadmissible.

(4) The Telegraph Directorate reserves to itself the right of using the station at any time, completely and absolutely, or for a definite kind of correspondence, and this they may do without giving their reasons, or without the concessionnaire being able to claim any indemnity.

(5) In case of war and mobilisation the station must be closed. The commander of the ship must superintend the closing and make himself responsible for it.

The control over the supervision of this measure is confined to the military authorities.

(6) Only Austrian subjects can be employed as telegraph operators, and they must be able to show a testimonial to the effect that they have successfully passed the special examination of the Telegraph Directorate.

Wireless telegraph operators on board ship must be provided with a sea service book, they must be enrolled in the muster, and must be subject to the ship's discipline.

In case of the cancelling of the abovementioned testimonial by the State Telegraph Directorate, a telegraph operator must be dismissed immediately.

Every change of operator must without delay be notified to the marine authorities in Trieste.

(7) The concessionnaire must allow to third persons the services of the station on payment by them of the normal charges.

(8) The station charge amounts to .... a word. The lowest telegram amounts to ....Kronen. The charge belongs to the underwriter.

(9) The station must exchange news with all coast stations, and with all other ship stations without prejudice as to the system of wireless telegraphy used by these stations.

(10) As regards the working of the station and the scale of the tariff, the regulations of the International Radio Telegraph Convention and its supplemental regulations must be observed, in the same manner as all measures published by the Telegraph Directorate.

The call signal of the station is established as....................................

C The following is a copy of the Decree of the Minister of Commerce of November 8th, 1910, concerning the installation of wireless stations on passenger ships engaged in the carrying service abroad :—

Austrian vessels of the merchant service making voyages from Austrian ports and carrying passengers beyond Gibraltar or Aden must be fitted with wireless telegraph apparatus

With regard to the fitting, working, and staff of such wireless stations, the conditions of the Decree of the Ministry of Commerce dated January 7th, 1910, must be complied with. Such stations must be capable of exchanging telegrams at a distance of 100 nautical miles, and above all must be of use, at the request of the Captain, for rescue purposes and for the safety of the vessel by communication with coast stations or with the stations of other ships without distinction of system.

The Royal Imperial Masters of Ports as well as Consuls are authorised to forbid the carrying of passengers on any ships passing beyond Gibraltar and (or) Aden not so fitted.

This decree will come into force one year after notice of same has been published.

D The following Regulation of the Ministry of Commerce, dated March 1st, 1912, concerns the erection of a wireless telegraphy inspectorate in Trieste, and the erection and regulation of wireless telegraphy offices on Austrian vessels.

(1) In accordance with the High Decree of February 15th, 1912, a Royal Wireless Telegraphy Inspectorate has been created, which is immediately subordinate to the Ministry of Commerce. On and after April, 1912, this department shall control the Wireless Telegraph offices on board Austrian ships, private Wireless Telegraph offices on Austrian ships and foreign ships in Austrian territorial waters.

Regulations.

E The following normal Regulations governing the installation and working of wireless telegraph offices on board Austrian ships came into force on April 1st, 1912 :—

(1) Wireless Telegraph offices on board ships under the State direction shall carry the sign "Kk Bordtelegraphamt" (Royal Telegraphy Office on Board Ship), together with the name of the vessel.

(2) The owner of a vessel who requires a Wireless Telegraph office must apply to the Ministry of Commerce, and must give the following particulars :—

(*a*) The name of the ship and the time and date when the installation is required to be erected.

(*b*) The routes on which the ship will be principally engaged.

(*c*) The accommodation for first and second-class passengers on board.

(3) The Ministry of Commerce must, within a period of two months, inform any applicant for a Wireless Telegraph installation on board ship whether such an installation will be granted, and, if so, upon what terms.

Provided the vessel on which it is proposed to instal a Wireless Telegraph office comes within the scope of the Decree of the Ministry of Commerce, dated November, 1910 (concerning the equipment for Wireless Telegraphy of long-voyage passenger ships) the Ministry of Commerce must grant any application made in accordance with these regulations.

In cases where the Ministry declines to grant an installation, it is not called upon to state any reasons for its refusal. A written agreement is in all cases drawn up between the State Department and the owner of the vessel when an installation is granted.

In the event of any change in the regulations, a new agreement must be made.

(4) The Wireless Telegraph office shall be installed as near as possible to the date required by the shipowner, provided the application sent has duly satisfied the conditions laid down in Regulation 2. The period during which the installation is granted is usually six months.

The State department shall bear the entire cost of the fitting and furnishing of the Wireless Telegraph office, which is to remain the property of the State. The department shall undertake to maintain the office in a state of efficiency and to supervise the working of the installation through its own servants.

(5) The shipowner shall be responsible for

the cost of all arrangements on board, services of the ship's *personnel*, materials and plant necessary for the proper installation and working of the Wireless Telegraph office, as well as the necessary electric power.

The shipowner's obligations with regard to these arrangements are set forth in detail in the written agreement referred to in Regulation 3.

The shipowner shall be required to provide adequate facilities for the telegraphists on board, to enable them to carry out their duties in an efficient manner; and the telegraphists must be made acquainted with the course and speed of the ship, soundings, and distances from foreign stations,as well as meteorological data.

6. The shipowner must pay the salaries due to the telegraphists for each voyage, which amounts thus paid will be refunded by the State, who will inform the owner, before the departure of the vessel, the amount of salary due to the telegraphists and the dates when the salaries become due.

The owner of the ship must make suitable provision for the safety of the telegraphists on board.

The owner must, at his own cost, carry out the following duties :—

(*a*) Carry telegraphists of the Royal Austrian Navy between Pola and Trieste when ordered to transfer them to or from the Wireless Telegraph Inspectorate at Trieste.

(*b*, Transfer the ship's telegraphists between the port and the ship which is being equipped with a Wireless Telegraph office, or between two ships, and provide for the maintenance of the telegraphists during the transfer.

(*c*) First-class travelling expenses and maintenance of the chief officials of the Royal Telegraph Department shall be provided when the officers are proceeding to take up their duties. Second-class travelling expenses shall be provided for officers of lower rank.

(7) The shipowner must contribute to the State Department an annual sum for the cost of the Wireless Telegraph office on board. In the case of ships which come under the decree of the Ministry of Commerce dated November, 1910, the amount which the shipowner must contribute is from Kr. 2,200 to 2,500, the amount depending upon whether the apparatus is of the first or second-class type. The Ministry of Commerce will decide under which class the apparatus comes. The annual amount is payable in advance, in instalments, which become due on the first day of the months January, April, July, and October. The liability of the owner of the vessel becomes due on the date when the Wireless Telegraph office on board commences operations, and ceases on the date of the closing of the office; but in any case not before the expiration of the term of notice.

If the ship should be lost, the obligation to contribute ceases on the date of the loss, and when this is not known, the obligation is dated from the last date on which the ship was heard.

When a vessel has received through its Wireless Telegraph office distress messages from other ships, and has thus saved or helped to save another ship, the owner must pay to the State Department 3 per cent. of the net sum received by him for salvage.

(8) Service messages to and from the owner of the ship are dealt with at ordinary rates; "shipowner telegrams" which are wireless telegrams transmitted by the captain of the ship to the owner, or to the managing officials or agents, and which deal with the crew, passengers, cargo condition, voyage, conduct, or damage of the ship, are not transmitted in the interests of a third person.

"Ship Service Telegrams" are wireless telegrams exchanged by the captains of ships under the same ownership. Both classes of telegrams must be composed by the senders, and code words must be used as far as possible. A copy of the code must be deposited on board ships that have to transmit shipowner and ship service telegrams, and likewise in the office of the department. Such telegrams must be written by the sender on a form having a detachable receipt coupon provided for the purpose. They are only transmitted when the receipt coupon has been impressed with the ship's stamp, and this stamp must agree with the stamp which is deposited by the commander of the vessel in the wireless telegraph office on board.

(9) The coast and land charges for shipowner telegrams are deferred and are fixed on the basis of the receipt coupon in the wireless office on board. These charges must be checked immediately after the arrival of the ship in her own port against the amount of the receipt in the wireless telegraph office on board.

The charges for private telegrams may be collected in cash by the officer in charge of the wireless telegraph office, at the time of the despatch of the telegram, or they may be placed to credit.

(10) Telegraph operators on board are subject to the general discipline of the ship, and to the instructions of the captain or his representatives. They must not, however, be called upon to participate in any of the ordinary business of the ship.

Free access to the premises of the telegraph office is allowed to the captain or to his representatives. Other members of the crew may have access to these premises only for the purpose of executing the duties mentioned in Regulation 5.

A member of the crew must be sufficiently competent to take the place of the operator in case of necessity, and before the beginning of the voyage the person so appointed must be sworn to secrecy in the usual way.

(11) The State shall provide a Wireless Telegraph office on board ship when it deems it necessary for a definite or indefinite period, and in this case the owner has no claim to indemnity.

In the case of mobilisation or war the embargo on the Wireless Telegraph office of a ship can be ordered by the Royal Austrian Navy or by a Royal Austrian Consulate.

The captain of a ship is responsible for the closing of a telegraph office when such an order proceeds from the authorities mentioned.

(12) The State may at any time create a Wireless Telegraph office on a ship not limited to the decree referred to in Regulation 3. The owner of the ship must receive not less than six months' notice of the intention to create such an office; but, where circumstances warrant it, this period of notice shall not be observed.

The owner must give six months' notice in writing of his intention to terminate the agreement referred to in Regulation 3, and in the case of the sale of the ship three months' notice.

After the expiration of the notice the Wireless Telegraph office will be dismantled (except in the case of the ship sold abroad), but the dismantling shall take place only when the ship is in an Austrian port.

In the event of the dismantling of the office taking place in a port other than that of Trieste, the shipowner must pay for the technical dismantling and material belonging to the State, and he must despatch the apparatus to Trieste at his own cost, and pay the fares of the telegraph operators to the last-named port.

TEMPORARY SERVICE REGULATIONS FOR WIRELESS TELEGRAPHISTS.

A.—General.

F 1. In the Wireless Telegraph service of the Government Post and Telegraph Organisation, and, outside the Royal Naval Reserve, State employees under the title of "Funkentelegraphisten" (wireless telegraphists) will be employed.

The appointment of wireless operators will only take place in case of a lack of Royal Naval Reserves.

The conditions of service of wireless operators is subject to the following regulations, which, however, do not in any case affect discipline on board ship either of Captains, Port Officials, or Consuls.

B.—Appointment.

The conditions for the appointment of wireless operators are as under:—

1. Proof of Austrian citizenship.

2. Freedom from any conviction in a criminal court.

3. Age limit, between 18 and 40 years.

4. Proof of bodily fitness and general capability for the service.

5. Proofs of the necessary knowledge of languages for the special conditions of service.

6. Proof of capability to obtain a ship's telegraphist's certificate in case one year has expired since the issue of the certificate held by the applicant or since the last practical work done by him. The applicant has to prove that he has sufficient practice to enable him to carry on the service in an appropriate manner.

7. Applicants under age must present proof of permission to enter the service from parents or those responsible for them.

The following are excluded from appointment:—

1. Those who, through conviction in a criminal court, have lost the right to enter the State service providing they have not regained same.

2. Those who have been bankrupts or who are trustees or guardians.

3. Those who have been employed by the State, and through some fault of their own have been dismissed therefrom.

Should a person who according to these regulations is excluded from appointment by any chance be appointed without the approval of the Minister of Commerce, he shall be considered as no longer belonging to the Service from the time that his undesirability for the Service is proved, and at once be dismissed therefrom without further ado.

4. Appointment is made by the Wireless Telegraph Department in Trieste by means of Service contract and either:—

(a) by notice, or

(b) for a certain voyage.

For appointment for a voyage only temporary use of the services of an operator as far as can be foreseen would be made, and State officials do not undertake any responsibility for the disadvantages which may be caused to an operator through the prolongation of the duration of a voyage of any ship on which he may be engaged.

When appointments are being considered, those persons who have requested the Inspectors' Department of the Service to put them in special or certain positions will first be taken into account.

The Service contract will be made in duplicate, one copy being handed to the employee against receipt for same, the other one being kept by the officials of the Department.

5. Wireless operators will be sworn in by the officials of the Wireless Department. The form of oath will be the one prescribed for other State officials.

C.—Rights and Duties.

6. For appointments subject to notice salary will be paid monthly. The monthly salary is due from the first to the last day of service inclusive.

Whether the salary commences or ends during the course of a calendar month, only the aliquot part will be paid, and 30 days will be reckoned as being one month.

7. For appointments for voyages salary will be paid by the day. The daily salary is due from the first to the last day of service inclusive.

In case a telegraphist who was appointed for a voyage should enter upon duty where he is subject to notice, he is entitled to any money outstanding under the conditions of the previous terms of appointment.

8. The payment of salary as mentioned in Par. 6 and 7 will take place on the last day of each month, but should an operator leave the service on a day other than the last of the month, he will be paid when he leaves. During a voyage the payment of salary will be made by the paymaster of the shipowners.

For voyages beyond the Mediterranean and Black Seas only one-half of the salary will be paid during the voyage, the other half being paid by the Wireless Telegraph Dept. at the end of the voyage.

9. Beside the regulation pay as per Par. 6 and 7, the wireless operator has a right to the following:

(1) The benefits conferred by the Regulations of the Board of Trade of March 1st, 1912, R.G.Bl. No. 43, from the shipowners, and especially for sustenance and attention on board.

(2) A share in the profits of telegrams transmitted as per the special rules.

Telegraphists appointed subject to notice are further allowed:

(*a*) For the period when not on board they receive an extra allowance of kronen 2 per day.

(*b*) For proofs of a mastery of a foreign language or languages, kronen 5 per month for each foreign language.

10. Operators may wear uniform whether on or off duty, but the wearing of any other uniform than that described in Supplement 5 is not permitted. Operators must use or allow to be used the wireless installations under their care *only* for the benefit of the State, and are moreover to continually bear in mind the safety of the ship.

Before going aboard, wireless operators must see that they have a sea Service Book in their possession.

E.—Cancellation of the Service Contract.

19. The Service Contract of operators appointed on notice may be cancelled:

(1) By a six months' notice from either party.

(2) By the obligation to enter the military service as prescribed by the law for the duration of the said military service.

(3) By dismissal.

20. The Service Contract of operators appointed for voyages may be cancelled:

(1) After the expiry of three days from the date of return from a voyage.

(2) By dismissal.

21. Except when a telegraphist has been dismissed from the Service, he has the right to a reference covering the period of his service.

F.—Staff Records.

22. At the Inspectors' Office of the Wireless Telegraph Department complete data regarding each wireless operator will be kept. The operator is bound to give any particulars by document or otherwise, and also to report any changes necessary in the said data.

AZORES

(See Portugal.)

BAHAMA ISLANDS

THE Bahamas (or Lucayos) are an archipelago of the British West Indies, lying between 21° 42′-27° 34′ N. lat. and 72° 40′-79° 5′ W. long., and extending from the coast of Florida on the north-west to Haiti on the south-east.

CONTROL AND ORGANISATION.

There is but one radio station in the colony, and that has been located in Nassau, New Providence. It was installed on August 28th, 1913, is owned by the colony, and controlled under the authority of the Governor in Council. It is operated by the Telegraph Department.

Official Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
P. H. Burn	Superintendent and Electrical Engineer	Nassau

ADMINISTRATION.

The Radiotelegraph Act, 1913, regulates the administration of wireless telegraphy.

A—Radiotelegraphic Act, 1913.

B—Rules made thereunder.

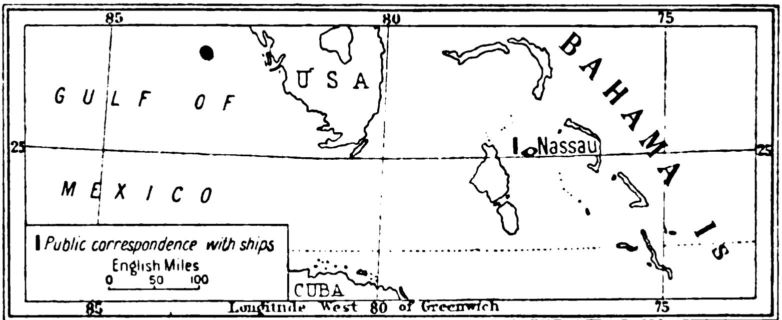
An Act

A To amend the Law relating to the Telegraph Department of the Colony.

(Assented to on July 7th, 1913.)

May it please the King's Most Excellent Majesty that it may be enacted and be it enacted by his Excellency George Basil Haddon-Smith, Esquire, Companion of the Most Distinguished Order of Saint Michae and Saint George, Governor and Commander-in-Chief in and over the Bahama Islands, the Legislative Council and Assembly of the said Islands, and it is hereby enacted and ordained by the authority of the same as follows:

1. This Act may be cited as The Telegraph Department Act, 1913.



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2. (1) The Telegraph Department shall consist of the Officers set out in the First Schedule to this Act. They shall be appointed by the Governor and shall hold office during pleasure and shall receive annually the respective salaries at the amounts and in the manner set out in the First Schedule to this Act. Provided that the persons holding such offices at the commencement of this Act shall continue to discharge the duties of such offices and to receive the emoluments thereof without the necessity of new appointment and their services under this Act shall be deemed to be in continuance of their services under any other Act for the purposes of any Act relating to pension or leave of absence or sick leave. Provided also that Patrick Henry Burns, the present holder of the office of Superintendent of Telegraphs and Electrical Engineer, shall continue to receive a salary at and after the rate of £400 a year.

(2) The annual increase of salary provided for in the First Schedule to this Act in the cases of the Clerk and the Operators shall be granted solely at the discretion of the Governor in Council and shall not be granted by him unless and until the Superintendent of Telegraphs and Electrical Engineer certifies that the officer eligible for the increase of salary is thoroughly efficient and reliable in the discharge of the duties of his office, and has discharged such duties in a highly satisfactory manner. Provided that in the case of the present holder of the office of Clerk the salary of that officer may be increased annually by sums not exceeding £10.

(3) In case of emergency the Governor may, with the approval of the Executive Council, appoint temporarily assistant operators under such terms and conditions and at such salaries as the Governor in Council may prescribe and determine, and any such salaries shall be paid out of the Treasury by warrant in the usual manner. Provided that no such appointment shall be for a longer period than six months.

(4) The Superintendent of Telegraphs and Electrical Engineer may with the approval of the Governor in Council, select and train such number of probationers, being British subjects, as the Governor in Council may determine with a view to the subsequent employment of such probationers under this Act if occasion shall so require and the Governor in Council shall think fit. No probationer shall be entitled to any payment.

3. No person other than a British subject shall be appointed to any office under this Act.

4. Any person appointed under this Act shall, in addition to any oath required by any Act, take such oaths of secrecy as may be prescribed by any Rules made under The Telegraph Acts 1891 to 1913.

5. The Acts set out in the Second Schedule to this Act shall be and the same are hereby repealed to the extent mentioned in the third column thereof.

6. This Act shall not come into operation unless and until the Governor notifies by Proclamation that it is His Majesty's pleasure not to disallow the same.

SCHEDULE.

Repeals.

Regnal Year and Chapter.	Short Title.	Extent of Repeal.
55 Vic. c. 1.	"The Telegraph Act, 1891" ..	Section 9; the words, "the payment of operators and assistants."
55 Vic. c. 4	"The Telegraph Amendment Act, 1892"	Section 7
58 Vic. c. 32	"The Retrenchment Act, 1895"	Section 1, the words and figures, "Superintendent of Telegraphs, £250."
2 Ed. VII. c 12	"The Telegraph Clerk's Salary Act, 1902"	The whole Act

RULES MADE BY THE GOVERNOR IN COUNCIL ON THE 3RD DAY OF NOVEMBER, 1913, UNDER THE AUTHORITY OF THE TELEGRAPH ACTS 1891 TO 1913.

B Paragraphs 1-14 inclusive refers solely to the wired telegraph system.

15. The radiotelegraph system shall be operated under the rules contained in the "Detailed Service Regulations" appended to the International Radiotelegraph Convention signed at London on the 5th day of July, 1912.

A copy of such "Detailed Service Regulations" shall be kept on file in the telegraph offices.

16. All apparatus for radiotelegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(a) Naval signalling, or

(b) the working of any radiotelegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between radiotelegraph stations established as aforesaid on land and radiotelegraph stations established on ships at sea.

17. No apparatus for radiotelegraphy on board a merchant ship shall be worked or used whilst such ship is in the territorial waters of the Colony, except with the special or general permission in writing of the Governor.

18. Rules 16 and 17 shall not apply to the use of radiotelegraphy for the purpose of making or answering signals of distress.

19. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by radiotelegraphy the use of radiotelegraphy on board merchant ships whilst in the territorial waters of the Colony shall be subject to such further rules as may be made by the Governor in Council from time to time and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

20. The master of any merchant ship on board of which apparatus for radiotelegraphy shall be worked or used contrary to these Rules shall on summary conviction before a Magistrate be liable to a penalty of £200 and in default of payment to be imprisoned for a period of twelve months.

TARIFF OF CHARGES.

21. From New Providence to the American Coast ninepence-halfpenny a word, plus the charges over the lines of other telegraph administrations, as published in the tariff book of the Western Union Telegraph Company, a copy of which shall be kept on file in the telegraph offices.

From New Providence to radio ship stations, threepence for each word, plus the rate charged by the ship station.

A "Deferred Message Service" at half the ordinary charge per word is in effect between the Bahamas and certain other countries.

A list of such countries and a copy of the rules governing this class of message shall be kept on file in the telegraph offices.

Made by the Governor in Council this 3rd day of November, 1913.

By order,
W. B. HADDON-SMITH, Captain,
Clerk to the Executive Council.

BARBADOS

(See map of WEST INDIES, p. 295.)

BARBADOS (latitude 13° 4′ N. and longitude 59° 37′ W.) is the most easterly of the West Indian Islands. Its superficial area is reckoned at 166 square miles, or rather more than that of the Isle of Wight. It fell first under British rule in 1605 and has so remained ever since, recording the fact in its most favoured epithet, "Ever British."

CONTROL AND ORGANISATION.

Wireless telegraphy in this colony owes much to a wireless club formed amongst a number of young Barbadians. Starting with some home-made apparatus, whose aerials were supported on bamboo poles, the local radiotelegraphic station, after the commencement of the late war, developed rapidly, assisted by a private subscription list which was headed by the Governor and Members of the Legislative Council.

Practical demonstration of its utility became so unmistakeable that it has now assumed the form of a regular two-kilowatt installation, maintained for defence purposes, but affording every facility (compatible with military considerations) to merchants and shipping agents. The station is not yet registered.

This constitutes the only land station in Barbados, and is worked under Government control.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Lieutenant-Engineer E. F. S. Bowen	Superintendent of Public Works ..	Barbados
Sergt. A. D. V. Chase..	In charge of Wireless Station	Barbados

The question of the transmission of weather signals is under consideration, but no rules affecting aviation have, so far, been considered.

ADMINISTRATION.

Wireless telegraphy in Barbados is worked under three Acts and two sets of regulations. The Barbados Wireless Act of 1905, two Amending Acts, passed in 1913 and 1917, a number of rules made under these latter acts, and Rules made by the Governor in executive committee regulating charges, made May 20th, 1919.

As these are quite distinct, we publish their respective texts below:—

A—Wireless Act, 1905 (confirmed 1908).
B—Wireless and Submarine Telegraph (Amendment) Act, 1913.
C—Wireless and Submarine Telegraphy (Amendment) Act, 1917.
D—Rules made under the 1913 and 1917 Acts.
E—Rules made by Governor in Executive Committee fixing charges.

WIRELESS ACT, 1905 (CONFIRMED 1908)

A 1. This Act may be cited as the Wireless and Submarine Telegraph Act 1905.

2. (1) The West India and Panama Telegraph Company shall not lay down or maintain a new telegraph cable nor shall any other company or person lay down or maintain any telegraph cable upon the foreshore and bed of the sea except under and in accordance with an Act of the Legislature.

(2) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy in any place in this island except under and in accordance with an Act of the Legislature.

(3) If the West India and Panama Telegraph Company lays down or maintains a new telegraph cable or if any other company or person lays down or maintains any telegraph cable upon the foreshore or bed of the sea without the authority of an Act of the Legislature in that behalf, the company or person shall be liable, on conviction before a Police Magistrate to a penalty not exceeding £100, and shall forthwith remove the telegraph cable, and if the telegraph cable be not removed within one day after such conviction the company or person shall be liable to a penalty not exceeding £50 for each day thereafter during which the company or person shall fail to remove the telegraph cable. Provided, that the Governor-in-Executive Committee may at any time after the expiration of one day from the date of the conviction cause the same to be removed and destroyed.

(4) If any person establishes a wireless telegraph station without the authority of an Act of the Legislature in that behalf, or instals or works any apparatus on any place in this island for wireless telegraphy without such authority in that behalf, he shall be liable, on conviction before a Police Magistrate, to a penalty not exceeding £100, and further be liable to forfeit any apparatus for wireless telegraphy installed or worked without such authority.

(5) If a Police Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without legal authority in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place within his jurisdiction without such authority in that behalf, he may grant a search warrant to any police officer named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station or place and to seize any apparatus which appears to him to have been used, or intended to be used, for wireless telegraphy therein.

(6) No proceedings shall be taken under any of the provisions of this section except by order of the Governor.

WIRELESS ACT, 1913.

Passed on April 11th, 1913.

B 1. This Act may be cited as the Wireless and Submarine Telegraph (Amendment) Act, 1913 (1913–16).

2 (1) *Making of Rules and Regulations.*—The Governor-in-Executive Committee may from time to time make rules and regulations governing the use of wireless telegraph apparatus on merchant ships, British or foreign, while in the territorial waters of this Colony.

(2) *Ratification.*—Such rules and regulations when sanctioned by both Houses of the Legislature and assented to by the Governor, shall come immediately into operation and shall have the same force and effect as if the same had been herein expressly enacted.

(3) *Penalties.*—If the master of such ship or any person on board such ship commits a breach of any of these rules and regulations

(*a*) The ship shall be subject to a maritime lien in favour of His Majesty the King, his heirs and successors, for a sum of one hundred pounds, and the amount so charged may be sued for and recovered in the Colonial Court of Admiralty;

(*b*) The ship may be detained by force if necessary by the Harbour and Shipping Master or his chief clerk, with the aid of the harbour police, until payment of the lien aforesaid or until arrested under process of the Colonial Court of Admiralty;

(*c*) The master of such ship shall be liable to a penalty not exceeding fifty pounds.

(*d*) The person committing the breach shall be liable to a penalty not exceeding fifty pounds.

3. (1) *Special Orders.*—In any case of urgency which is not provided for in the rules and regulations, the Governor may make any special order, and such order shall come immediately into operation and shall have the same force and effect as if the same had been herein expressly enacted.

(2) *Penalties.*—If the master of such ship or

any person on board such ship commits a breach of any special order, the ship shall be subject to the maritime lien imposed by section 2 of this Act for the amount therein mentioned and may be detained as is therein provided, and the master, and the person committing the breach, shall be liable to a penalty not exceeding fifty pounds.

AN ACT

C To amend the Wireless and Submarine Telegraph Amendment Act, 1913. (1913-16.)

Be it enacted by the Governor, Council, and Assembly of this island, and by the authority of the same, as follows:

1. This Act may be cited as the Wireless and Submarine Telegraph (Amendment) Act, 1917.

2. The Wireless and Submarine Telegraph (Amendment) Act, 1913, is hereby amended by inserting the words "and yachts" immediately after the words "merchant ships" in line three of subsection 1 of section 2 thereof, and the word "ship" wherever occurring in the subsequent parts of the Act shall be construed as including a yacht.

3. The Regulations made under the authority of the said Act by the Governor in Executive Committee on the thirty-first day of July, nineteen hundred and thirteen, shall apply to yachts as fully and in the same manner in all respects as they do to merchant ships.

Rules made by the Governor in Executive Committee under Section 2 (1) of Act 1913-16, on July 31st, 1913, confirmed August 11th, 1914.

D 1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony except with the special or general permission of the Colonial Secretary of the Colony.

3. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Rules made by the Governor in Executive Committee regulating the Charges to be made by the Wireless Telegraph Station for Messages, etc.

E 1. The following charges will be collected:

(*a*) For a message to be sent:—6d. per word, minimum charge 5s. (exclusive of any ship's charges) to be paid by the sender. All charges on messages accepted to be sent must be paid to the operator on duty at the time of acceptance;

(*b*) For a message received by wireless telegraphy to be delivered locally:—6d. per word, minimum charge 5s., to be paid by the addressee.

2. On receipt of a message to be delivered locally, the addressee will be informed by telephone that a message is at the station for him which will be delivered to his written order or agent on payment of the charges to the operator on duty, the amount of which will be told him at the same time. If the addressee cannot be reached on the telephone and is within 3 miles of the station, the message will be delivered by messenger at an extra charge of 6d. per mile and a half; in this case all charges will be paid to the messenger. Besides paying the charges a receipt must be given before a message can be delivered.

3. In order to expedite the delivery and transmission of "Agents'" messages, letters guaranteeing to pay all charges on messages sent by or delivered to them may be accepted. Messages will then be accepted from and delivered to them without pre-payment of charges, which will be collected from them in accordance with the terms of this letter.

4. In case a message which has been accepted for transmission has not been "sent" by the Station, half the fees paid by the sender will be remitted. Messages to intercept ships are not included in this.

5. Private messages can only be accepted when addressed c/o the Agents.

6. Messages are accepted and sent entirely at sender's or addressee's risk, the Government accepting no responsibility whatever

7. Operators are required to give receipts for all money received by them for the use of the Station from the receipt books supplied and to account to the Sergeant in Charge, who will pay them in to the Colonial Treasurer.

Made by the Governor in Executive Committee this 8th day of May, 1919.

W. L. C. Phillips,
Colonial Secretary (Acting).

Colonial Secretary's Office,
May 20th, 1919.

FORM OF A LETTER OF GUARANTEE

To the Colonial Secretary, Barbados.

We hereby guarantee to pay the dues and charges on all messages delivered to the Military Wireless Station at Barbados to be sent at our request, and to pay all dues and charges on all messages received by Wireless Telegraphy addressed to us, or to either of us or to the firm or to either of the firm's employees or addressed to anyone else and relating to the business of the firm, or in connection with ships or vessels consigned to the firm, and to pay these dues and charges weekly, on every Thursday for the week ending on the previous Wednesday. This letter to continue in force and be of full effect for three months after date of signature.

Dated this...... day of........, 1919

6d. Stamp.

BASUTOLAND

(See South Africa, Union of.)

BASUTOLAND, an inland native territory of South Africa lying between 28° 45′ and 30° 40′ S. latitude, and a longitude of 27° 0′ and 29° 30′ E., is governed by a Resident Commissioner under the direction of the High Commissioner for South Africa and located at Maseru, its principal town. The latter high official possesses legislative authority which is exercised by proclamation. Telegraph offices have been opened at Leribe, Maseru, Teyateyaneng, Morija, Mafeteng, Mohale's Hoek, and Quthing. The "Territory" covers an area of 11,716 square miles, and has been directly under the authority of the Crown since 1884; it forms an irregular parallelogram on the north-east of the Cape Colony, and the seven districts into which t is divided bear the reputation of including the finest agricultural and pastoral land in South Africa.

ADMINISTRATION.

In 1904 a proclamation was issued, which we print below, making provision for the working of wireless telegraphy within the territory.

A Proclamation making provision for Wireless Telegraphy.

PROCLAMATION.

No. 5 of 1904.

By His Excellency the High Commissioner for South Africa.

Whereas it is expedient to make provision for the working of wireless telegraphy within the territory of Basutoland;

Now therefore by virtue of the powers in me vested I do hereby proclaim, declare and make known as follows:

1. No person shall establish or use any apparatus or installation for the transmission of messages or other communications by means of electrical energy without the aid of wires without having previously obtained a licence as hereinafter provided.

2. (1) It shall be lawful for the Resident Commissioner to authorise the issue of a licence for either of the purposes mentioned in Section 1 and to revoke the same at any time, and there shall be payable in respect of such licence the sum of one hundred pounds.

(2) Every such licence shall be deemed to be granted upon such terms and conditions as the High Commissioner may from time to time prescribe by notice in the *Gazette*.

3. Any person who shall establish or use or attempt to establish or use any such apparatus or installation as is mentioned in section 1 in contravention of the provisions of this Proclamation shall be liable upon conviction to a penalty not exceeding two hundred and fifty pounds and in default of payment to imprisonment with or without hard labour for a period not exceeding three months and in case of a second or subsequent conviction to a penalty not exceeding five hundred pounds or in default of payment to imprisonment with or without hard labour for a period not exceeding six months.

4. This proclamation shall take effect from the date of its publication in the Gazette.

Given under my Hand and Seal at Johannesburg this twenty-fourth day of February, One Thousand Nine Hundred and Four.

MILNER,
High Commissioner.

BELGIAN CONGO

(See map on p. 114.)

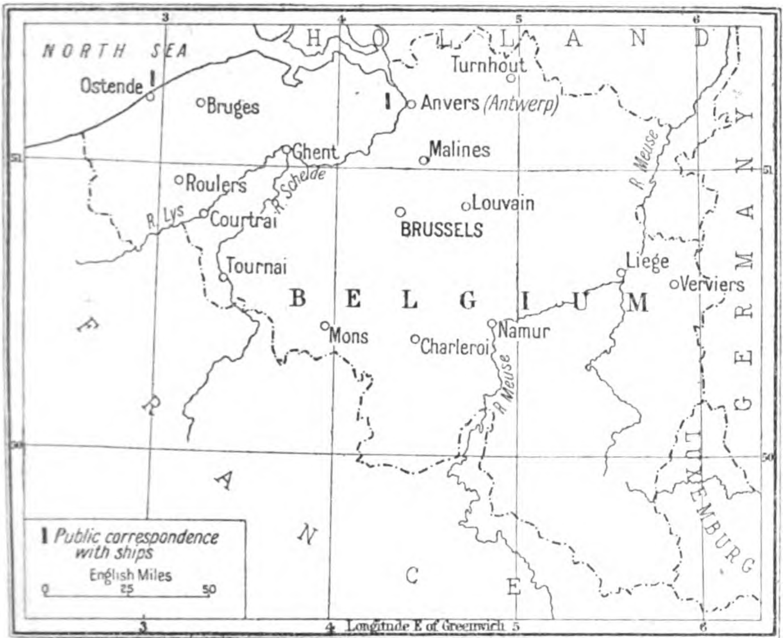
BELGIUM

BELGIUM, after being joined with Holland from 1815, formed itself into an independent State in 1830, under Prince Leopold of Saxe-Coburg, who ascended the throne on July 21st, 1831. According to the constitution of that date Belgium is "a Constitutional Representative and Hereditary Monarchy," the legislative power being vested in the King, the Senate and the Chamber of Representatives. The present King Albert, born on April 8th, 1875, succeeded his uncle on December 17th, 1909.

The total area of the kingdom was estimated befroe the war, at 11,373 square miles, and was divided into nine provinces, the capital city being Brussels. At the Paris Peace Conference the territory of Eupen, Malmedy, and Moresnet was allotted to Belgium.

CONTROL.

Wireless telegraphy in Belgium is under the control of the Telegraph and Telephone Administration, which forms one of the departments of the Ministry of Railways, Marine, Posts and Telegraphs.



For technical purposes the Administration is divided into two departments and six districts. Each district, administered by an engineer-in-chief, and assisted by a principal engineer and other engineers, includes several sections or special technical services.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Poullet	Minister of Railways, Marine, Posts and Telegraphs	Brussels
Mr. A. Roosen	Director-General Administration of Telegraphs and Telephones	Do.
Mr. E. Pierard	Director of Telegraph Department	Do.
Mr. C. Dussart	Director of Fifth Technical District, Telegraph Department	Do.
Mr. P. Dubois	Principal Engineer, Fifth Technical District, Telegraph Department	Do.
Mr. R. Corteil	Chief Engineer, Wireless Technical Service	Do.
Mr. Van Heemstée	Assistant Engineer, Wireless Technical Service	Do.

ORGANISATION.

In 1901, when wireless was still in its infancy, trials were made between La Panne and a Belgian mail boat, to which trials, Mr. A. Roosen, Director-General of Telegraphs; Mr. Pierard, Director-General of Marine; and Mr. E. Pierard, Director of the Telegraph Administration, devoted all their attention, and contributed to the application and development of wireless in Belgium.

The results obtained having been adjudged sufficiently satisfactory for the establishment of wireless between the mail boats and the Belgian coast, provision was made in 1902 for the installation of a coast station at Nieuport (Bains), and of 10 stations on the mail boats, for the purpose of increasing the

security of navigation of these ships. This was the first public wireless service inaugurated on any ship afloat.

As progress was made in the domain of wireless, experiments were undertaken to establish the value of improved methods and new apparatus. These trials led in 1909 to plans for completely reorganising the original installations. Subsequently, modifications were introduced at Nieuport (Bains) and to the mail boat installations.

The application of wireless in Belgium is perforce limited, on account of the small extent of territory affected, the necessity of avoiding interference with the stations in neighbouring countries, and the network of existing telegraph lines and other apparatus for speedy communication.

The telegraph service of the mail boats and of the Ostend coast station is open to the general public.

The coast station at Nieuport (Bains) was dismantled on August 22nd, 1914, as the enemy patrols approached the Yser region, whilst the stations installed at the Red Star Line offices in Antwerp and at Laeken (Brussels) were also destroyed in August, 1914.

A temporary station is in operation at the water-works, at Ostend, until the new Ostend station is ready, and is fitted with a 1½ kw. Marconi installation with emergency gear, as well as with a 1 kw. C.G.R. installation.

Another station is in operation at the Pilot House at Antwerp, fitted with a 1 kw. S.F.R. installation, and a private coast station for the Pilot Service is in contemplation.

The wireless receiving service organised in certain towns for the horological service will be continued as before the war.

Provision is being made for the installation of radiogoniometric stations on the Belgian coast.

The new steam pilot boats will be equipped with wireless telegraphy; also lightships and Government tugs. The North Sea survey ship, *Ville d'Anvers*, has already a wireless installation in operation

ADMINISTRATION.

The administration of Wireless Telegraphy in Belgium is regulated by a law and Royal Decrees, which are reprinted below:—

A—Law of July 10th, 1908, regulating the use of wireless telegraphy and telephony.

B—Royal decree of October 19th, 1908, regulating the application of charges on wireless messages.

C—Royal decree of November 3rd, 1913, regulating the conditions of installation and the working of wireless stations.

D—Decree regulating ships' licences, September 10th, 1918.

E—Technical and administrative regulations relating to ship stations, October 15th, 1918.

F—Circular No. 1 of October 18th, 1918, addressed to shipowners.

A 1. LAW OF THE 10TH JULY, 1908, RELATING TO TELEGRAPHY AND TELEPHONY BY EITHER TRANSMISSION.

Art. 1. The Government is authorised to undertake the establishment and transmission of wireless telegraphy and telephony by ether waves.

Art. 2. On Belgian territory or on board of a Belgian steamer or vessel no one is allowed without authorisation previously obtained from the Government to erect, establish or cause to be erected or work apparatus for radio transmission capable of carrying out or prejudicing communications.

Each infraction of the clauses of the provisions of the present Article involves liability to a fine varying from 200 to 2,000 francs, together with imprisonment varying from eight days to a year, or either of these penalties alternatively. Such infringement will carry the additional penalty of confiscation for the benefit of the State of the apparatus and all other objects specially designed for their working. Moreover, the Law Officers shall be able to order suspension in the carrying out of the confiscation of all apparatus and other objects or of a part thereof by placing them in temporary sequestration for a term which may be fixed by the tribunal. This sequestration shall be raised if the interested party or his legal representatives shall obtain authorisation to make use of the apparatus. In default of such authorisation, the confiscation of his effects shall take place immediately on the expiry of the term fixed under the judgment, unless the competent Minister shall authorise the delinquent either to destroy the apparatus or to transfer its possession to a duly authorised concessionaire.

The preceding arrangements shall apply even in case of acquittal of the accused, when it has been established that the apparatus and other objects giving rise to the prosecution come under the category covered by the two first paragraphs of the present article.

ART. 3 The Government shall fix the rates, as well as the rules of administration and order relative to radiotelegraphy and telephony. Infringement shall be punished in accordance with the penalties established by the law of the 6th March, 1908.

ART. 4.—The authorisations referred to in Art. 2 are granted by the Minister exercising jurisdiction over the telegraphic and telephonic services in agreement with the other ministers affected. They shall specifically enumerate their duration, the conditions of installation, use of apparatus, charges where such are made, royalties payable to the public treasury penalties for infringement and all other limiting conditions, dictated by the interests of public order, as well as by the security and defence of the realm. In the event of infringement of the conditions of authorisation, the latter may be withdrawn by the Minister who granted it. Nevertheless, no royalty can be claimed when it has been proved to the satisfaction of the Minister in Charge of the granting of authorisations that the applicant has no other object than that of experimenting with or making use of the apparatus for his private purpose without making any charge whatsoever.

ART. 5.—No one can establish or work on board a foreign ship or vessel apparatus for radio transmission which can carry out or prejudice radiotelegraphic or radio-telephonic communication, so long as the ship, or vessel, is located in Belgian Territorial Waters, if its action be not in accord with the prescribed regulations set out in Art. 3. The competent Minister may at any time forbid the use of apparatus, or lay down with regard thereto such measures of precaution, supervision and control as he judges necessary.

All infringements of the regulations of the present Article are liable to a fine of 100 to 500 francs. The Law Officers may order the sequestraton of apparatus, and of all other objects specifically adapted to their working, for the duration of the stay of the aforesaid vessel in Belgian waters. Such sequestration may be annulled if the interested party obtain from the competent Minister an authorisation to make use of the apparatus in question.

If, after the annullment of the sequestration, the interested party commits a fresh infraction of the conditions laid down, the fine may be doubled and the apparatus and other objects confiscated for the benefit of the State.

ART. 6.—If for any cause, either by reason of public order or the security and defence of the realm, the government shall judge necessary to suspend the whole, or part of the service, the Concessionaire shall be obliged to obey the first instructions given him to that end.

In the same circumstances the competent Minister may either order the apparatus to be put out of action or sequestrated, or he may put the apparatus in the hands of his own agents instead of those of the Concessionaires. These measures shall be taken for the duration of the period judged necessary by the government and shall give rise to no claim for indemnification at the hands of the State.

ART. 7.—The penal laws relative to wireless telegraphy and telephony are applicable to governmental radiotelegraphy and telephony, as well as to such installations and services as have been duly authorised for public communication.

ART. 8.—The Government may designate the functionaries who shall be sworn in as officers of judiciary police for the investigation of the infringement relative to wireless telegraphy and telephony. The official reports drawn up by these functionaries shall be considered correct until they are proved otherwise.

The above-mentioned functionaries shall take precedence, so far as infringements relative to wireless telegraphy and telephony are concerned, over all other officers of judiciary police, with the exception of the Public Prosecutor and the Police Magistrate.

ART. 9.—When there are found to be sufficient traces of the existence of wireless telegraph or telephone installations not regularly authorised or employed, the police magistrates shall visit the localities in which the aforesaid installations shall be presumed to exist, in order to make all necessary investigations into the truth of the allegations, even although it may be necessary to secure access to private property for that purpose.

He may take with himself one or more experts or functionaries sworn in in accordance with the terms of the preceding Article.

He may either effect himself or cause to be effected, by any and all of the officers of the judiciary police, seizure or dismantlement or temporary sequestration of the apparatus set up or employed without regular authorisation, as well as that of all other objects subject to confiscation in accordance with the terms of Arts. 2 and 5 heretofore set out.

ART. 10.—The State undertakes no responsibility for the service of communication by radiotelegraphic or radiotelephonic means.

ART. 11.—The present law shall come into operation the day after its publication.

B 2.—ROYAL DECREE OF THE 19TH OCTOBER, 1908, RELATING TO CHARGES FOR RADIO-TELEGRAMS.

Royal Decree authorising the Minister of Railways, Posts and Telegraphs to settle the amount of charges fixed when necessary in the authorisations for delivery by application of Articles II. and IV. of the Law of the 10th July, 1908, relating to wireless telegraphy and telephony by ether transmission.

. . . .

In view of the Law of the 10th July, 1908, relating to wireless telegraphy and telephony:

In view of the International Radiotelegraphic Convention concluded at Berlin in 1906 and the further Acts which complete it:

and

Inasmuch as it is desirable to simplify—so far as charges are concerned—the formalities which appertain to the delivery of Acts authorising the establishment and working of ether transmission, at the suggestion of our Minister of Railways we hereby agree:

Sole Article.—Within the limits fixed by the International Convention relating to Radiotelegraphy and Telephony, our Minister of Railways, Posts and Telegraphs is hereby authorised to settle the amount of charges, when such arise, in the authorisations which he is empowered to issue under the authority of Articles II. and III. of the Law of the 10th July, 1908.

Given at Laeken, the 29th October, 1908.

(Sgd.) LEOPOLD.

C
3.—ROYAL DECREE OF THE 3RD NOVEMBER, 1913, RELATING TO THE CONDITIONS UNDER WHICH WIRELESS TELEGRAPHY SHALL BE INSTALLED AND WORKED.

In view of Art. III. of the Law of 10th July, 1908, which authorises the Government to settle the rules of administration and police relative to radiotelegraphy and telephony :

In view of the Law of 6th March, 1908, relating to the penalties incurred by contravention of general measures of interior administration, as well as to the penalties which may be inflicted under the rules laid down by provincial and communal authorities :

and

In view of the proposal of our Minister of Marine, Posts and Telegraphs, we have settled and hereby decree :

ART. 1.—On Belgian territory and on board ships or vessels of Belgian nationality, every and each proposal for the installation of apparatus for ether transmission, capable of assisting or prejudicing the transmission or reception of radiotelegraphic or radiotelephonic signals, as well as all proposals for modification in their employment, and also every and each proposal for the erection or modification of an installation which has already been duly authorised, ought to be submitted to the Department of Marine, Posts and Telegraphs as a preliminary to their starting operations.

Any request for authorisation must indicate the character of the installation, the object of its use, so far as concerns wireless stations on board ship, tariff of charges proposed, detailed list of the apparatus and of the methods of working, wave-lengths, hours of watch, and generally all information of a character such as will facilitate detailed examination of the scheme. There shall be moreover thereon set forth the steps it is proposed to take to prevent interference with the service of other official or authorised stations.

ART. 2.—Such authorisations are issued subject to the reservations and conditions which may be judged necessary in the interests of the convenience and defence of the realm, including the safeguarding of public and service messages.

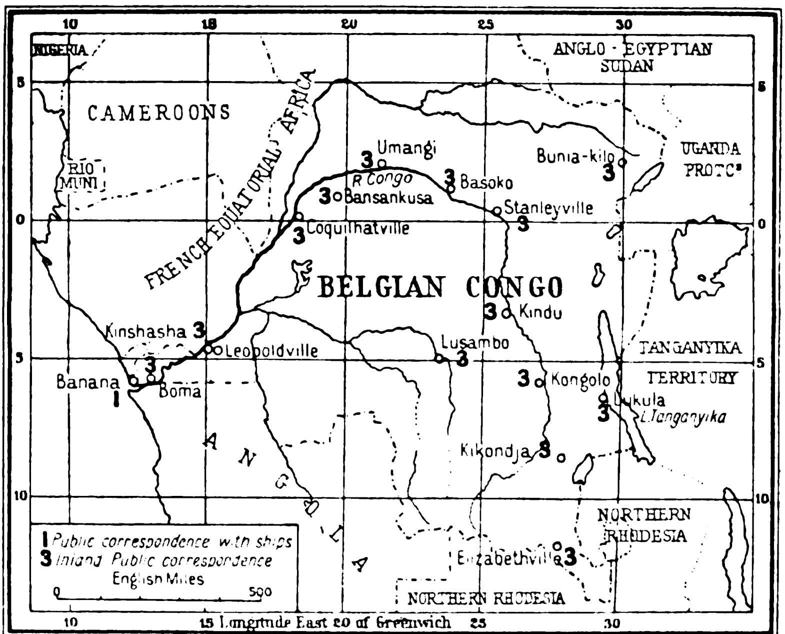
ART. 3.—A new authorisation becomes necessary :

1. If the Station has not been installed or modified and put in working order within the period fixed by the Decree of Authorisation.

2. If it has been put in working order or made use of under the conditions other than those set out in the Decree of Authorisation.

ART. 4.—Installations not regularly authorised which shall have been set up previous to the coming into force of the present Decree shall not be privileged thereby : their service must be suspended and a request for authorisation applied for under the conditions and forms set out under Article I. of the present Decree.

ART. 5.—On entering into Belgian territorial waters foreign ships fitted with wireless installations capable of assisting or prejudicing transmission or reception of radiotelegraphic or radiotelephonic signals shall cease communication with any neighbouring stations other than the nearest State stations. They shall announce their presence to these coastal stations and await authorisation or invitation



to communicate either with the aforesaid or some other coastal station.

The preceding arrangements shall not apply to foreign ships and vessels, provided that previous to their entering within Belgian territorial waters they shall have been provided under order of the competent Belgian Minister with his special and regularly accredited permit for communication. They shall not interfere in any way with distress signals or the answers to distress signals emanating from other ships or vessels.

To sum up: Foreign ships and vessels are enjoined from the time of their entering into Belgian territorial waters to cease all working which may prejudice the communications of any radiotelegraphic or radiotelephonic stations whatsoever.

Art. 6.—On Belgian territory and within Belgian territorial waters as well as on board Belgian ships and vessels located in foreign waters, duly appointed delegates of the Government shall have free access at all hours of day and night, in accordance with Article VIII. of the Law of 10th July, 1908, to all ships, vessels and steamers on which regularly authorised installations may be working, or for which a communicating premit has been granted. The owners, managers, charterers, commanders, agents, masters, and personnel are enjoined to facilitate by every possible means the duties of verification and control vested in these delegates.

Art. 7.—The owners, managers and charterers are civilly responsible for the payment of fines decreed against their commanders, directors, agents, masters, or personnel. Our Minister of Marine, Posts and Telegraphs is charged with the execution of the present Decree.

Art. 9.—The present Decree shall come into force the day after its publication dated Brussels 3rd November, 1913.

D 4.—DECREE OF THE 10TH SEPTEMBER, 1918, RELATING TO SHIPS' LICENCES.

Albert, King of the Belgians, to all here present and to come, greeting.

In view of Art. 26 of the Constitution which confers the exercise of legislative power on the Ruling Sovereign, in concert with the Chamber of Representatives, and the Senate; and in view of the impossibility of assembling the Legislative Chambers.

Under the advice of our Minister of Railways, Marine, Posts and Telegraphs, and Foreign Affairs, and in conjunction with our Ministers united in Council we have decreed and do decree.

Art. 1.—On and after 15th October, 1918, it is enacted that before starting from either a Belgian port or a port belonging to an allied or neutral nation of Belgium, sea-going vessels engaged, or that may become engaged wholly or partially in commercial transport, must be furnished with a licence issued in the name of the Minister of Railways, Marine, Posts and Telegraphs, by the Director-General of Marine or by his representative.

Art. 2.—Other requests for licences must come from the ship owner or charterer or their agents and must be set out in writing in conformity with the provisions of a model approved by Ministerial decree.

Art. 3.—Every licence shall be issued for one or several voyages or for a limited period. Any licence given for more than a single voyage is always liable to cancellation.

Art 4.—A licence will be refused whenever the authority entrusted with the investigation of the request shall judge that the vessel may—so far as the itinerary or conditions of shipment are concerned—be utilised in a manner more convenient for national interests than it would be if the voyage were carried out under the arrangements set forth in the application, or when such a voyage as that therein set forth would unduly expose the vessel to the risks of war, which the national interests demand shall be avoided.

Art. 5.—A licence shall be also refused if the authority entrusted with the investigation of the request shall judge that by its general condition, or that if its engines, fittings, means of defence, or composition of personnel, the vessel is insufficiently well-found with regard to safety for the voyage for which the licence is being requested.

Art. 6.—Marine Commissioners, Consuls, and Agents designated for that purpose by the authority entrusted with the consideration for the request for licence, shall have the right of access at all times and in all places on board of Belgian sea-going vessels with the object of investigating whether the aforesaid vessel fulfils the conditions necessary for the granting of a licence or whether the conditions under which the licence may have already been granted are well and duly carried out.

Every owner, charterer, or master is enjoined to give the aforementioned officials every necessary aid in the discharge of their duties.

Art. 7.—The Marine Commissioner in Belgian ports and the Belgian Consul in foreign ports may, without prejudice to Art. 9 of the Decree of the 2nd February, 1916, withdraw the permission to navigate from any vessel not furnished with a licence or which shall navigate in violation of the conditions of the present Decree.

They shall be able to arrest, or have it put under arrest by the local authorities—the ship may even be ceased on the high seas.

Art. 8.—In the event of violation of the regulations of the present Decree, the Marine Commissioner or the Council shall draw up a circumstantial indictment, every item of which shall hold good until disproved. A copy of this indictment will be sent within 24 hours to the captain of the ship.

Art. 9. — The captain, shipowner, or charterer, who may at any time have been guilty of an offence against the regulations of the present Decree, shall be liable to imprisonment varying from a week to two years, together with a fine varying from 26 frs. to 2,000 frs., or, alternatively one of these penalties. Confiscation of the ship will be enforced, and if enforcement be not possible, the tribunal shall substitute therefor the payment of a fine equal to the value of the vessel.

If there be any extenuating circumstances, the confiscation of the vessel, or the payment of a sum equal to its value, may be obviated in consideration of a payment of some sum less than its value.

Art. 10.—All the provisions of Section I. of the Penal Code apply to the infringement of regulations set out in the present Decree.

Art. 11.—Any individual, Belgian or foreign, who shall commit outside the Royal domains, an offence against the present Decree, can be proceeded against in Belgium. If he does not appear, judgment may be passed default.

Art. 12.—So far as the present Decree concerned, by "captain" may be understo

any person who exercises the captain's function on board.

We hereby promulgate the present Decree and order that it shall be sealed with the State Seal and published in the *Moniteur*.

Given at our Headquarters,
10th September, 1918.
Sealed (ALBERT).

E REGULATIONS RELATING TO TECHNICAL CONDITIONS, INSTALLATION, UPKEEP, SURVEY AND TRAFFIC OF RADIO-TELEGRAPHIC STATIONS ON BOARD BELGIAN VESSELS.

Dated 15*th October*, 1918.

ART. 1.

Systems of Radiotelegraphic Apparatus.

The choice of wireless apparatus and arrangements to be employed is left open under the *express reservation of parliamentary approval*, by the Department of Railways, Marine, Posts and Telegraphs of Belgium, which is entrusted with the supervision and control of Radiotelegraphic Installations on board Belgian ships.

Account will be principally taken of the efficiency of the system from all points of view, including the reliability of machines and apparatus, facilities for supervision, for the upkeep of the station, for the replacement of apparatus or parts which may be damaged.

It is extremely desirable, however, that choice should be made of a system with a musical note. Such a kind of note will be obligatory for vessels plying in tropical zones.

ART. 2.

Construction of Radiotelegraphic Installations (Conditions to be fulfilled).

Installations must fulfil the conditions laid down in the Radiotelegraphic Convention of London, 1912, and the supplements thereto, modified by the present code of Rules and later on by subsequent regulations.

(*a*) *Principal Transmitting Station.*—Radiotelegraphic installations must be able to transmit by day, from one ship to another of the same class signals which can be clearly read under normal circumstances and conditions at the minimum distance laid down hereafter.

200 nautical miles (about 1,852 metres) for vessels of 6,000 tons and upward.

100 nautical miles for vessels of 3,000-6,000 tons.

75 nautical miles for vessels of 1,500-3,000 tons.

40 nautical miles for vessels of less than 1,500 tons.

Special conditions with regard to range may be imposed for vessels devoted partly, or wholly, to long distance passenger traffic, or such vessels as ply under special traffic conditions.

With the object of enabling the operator to keep himself effectively in touch with, and to regulate the working of the transmitting station, and the energy radiated therefrom by the antennæ-earth circuits, there shall be supplied an unshunted thermal ammeter, specially adapted for measuring currents of high frequency.

It must be possible to pass rapidly from a wave-length of 600 metres to that of 300 metres and *vice versa*.

(*b*) *Apparatus for Syntonisation and Reception.*—Besides the regulating arrangements relative to the reception of wave-lengths of 600 metres or less (*see* Service Regulation annexed to the London Convention of 1914, Art. 7, Section C), the apparatus must allow for reception, with a margin of insurance against interference of transmissions operated on a wave-length up to 3,000 metres.

Use must be made of sensitive and very stable detectors specially adapted for the reception of musical notes.

The reception apparatus must include at least two detectors.

Arrangements must be made for avoiding any induction due to badly established electric circuits, or to any other cause which may tend to obscure faint signals.

Some suitable arrangement must ensure the silence of receiving telephones during transmission, whether the latter is being made through the main station, or the emergency set.

A suitable and conveniently placed buzzer must be carried for the verification of the satisfactory working of the different circuits of the reception apparatus and of the detectors.

(*c*) *Emergency Transmitting Gear.*—*Every board-ship station, whatever may be the constitution of its principal Transmitting Station, must include an emergency set*, in conformity with Art. 11 of the Regulations of Service appended to the International Radiotelegraphic Convention of London, with the object of ensuring the possibility of reception when the current of the ship's generator fails, or some mischance puts the principal station out of action.

This emergency set must of necessity be actuated by an accumulator battery with a sufficient capacity and of at least 24 volts. If, however, the principal transmitting station carries an accumulator battery suitably equipped and located, this battery or a part thereof, may serve as the source of energy of the emergency gear.

The emergency set must have a minimum range of 80 nautical miles for vessels of 6,000 tons and upward; or for those of smaller tonnage, partly or solely engaged in long distance passenger service; of 50 nautical miles for vessels of 1,500-6,000 tons which do not come under the above-mentioned category; of 30 nautical miles for vessels of less than 1,500 tons.

When the emergency set includes an induction coil it must be possible to utilise it: (*a*) for transmitting by direct excitation (plain aerial); (*b*) for the emission of syntonised and slightly damped waves obtained by feeding the condenser of the primary oscillating circuit of the principal set from the secondary of this coil.

The above apparatus must allow of a rapid change from one of these methods of transmission to the other.

All arrangements must be made so that the emergency set may be put into action instantaneously.

ART. 3.

Antennæ.

(*a*) *General Conditions.*—Antennæ must always be maintained in perfect condition, not only with regard to rigidity but also with regard to electrical resistance.

All the connections of antennæ must be rigidly soldered with the greatest care. Soldering must be carried out with resin to the exclusion of all liquid which might act on metal.

Every precaution must be taken that no strain be put upon a soldered joint, or upon any part which has been heated.

The same precautions must be taken in the case of a broken connection.

Besides the principal antennæ which is in every-day use, there shall be carried on board a single-strand antenna in reserve as well as a small emergency antenana.

(*b*) *Principal Antenna*.—This must be of a multiple-stranded type strongly fixed.

This antenna must be furnished with straying guides suitably insulated, with their ends attached to the yards in order to avoid shifting under wind-strain or the motion of the ship.

(*c*) *Reserve Single Strand Antenna*.—In order to afford a temporary stopgap when the principal antenna has been badly damaged by bad weather and when circumstances render reconstruction impossibe for some little while, and with the object of carrying on a makeshift radiotelegraphic service, every vessel must carry a single strand reserve antenna of a convenient shape and size. This antenna shall be stretched on a special support furnished with its own insulator—constructed of an unbreakable and elastic material like rubber or caoutchouced rope—and placed in the wireless cabin ready for the operator's use.

The two masts intended to serve as supports shall be furnished each with a reserve block fixed as high as possible and with a continuous halliard serving exclusively for the haulage of the single strand antenna. These blocks and gear for the spare set must always be maintained in perfect order.

(*d*) *Emergency Set*.—Experience has shown that the explosion of a torpedo or a mine fairly frequently entails the fall of a mast, and consequently tears down the antennæ at the same time, thus preventing the vessel from sending out wireless calls for aid.

In order to neutralise the consequences of such a mishap every ship must be furnished with a small emergency antenna *totally separate from the masts*.

This antenna must be multiple stranded with the object of ensuring a sufficient sending range It may be of a prismatic or cylindrical type with four or six strands (of the pattern usually spoken of as "sausage"); it shall be fixed by the aid of blocks, say, on one side to the top of a funnel and on the other to the apex of a small spar attached to the wireless cabin or the wheel house, etc.

This antenna should be given as much extension, both from the point of view of capacity and height, as is practically possible under the circumstances. In the neighbourhood of a funnel it would not be possible to use for its fixture either blocks, insulators or fastening material which might be affected by heat or steam (such as ropes, ebonite, rubber, etc.). This emergency antenna must be permanently fixed on the exterior to an insulator with a special lead-in of a type similar to the insulator of the main antenna. Evey care must be taken to ensure the practicability of its being instantly connected with the apparatus for transmission and reception in the interior of the cabin.

(*e*) *Metal Stays*.—The metal stays of masts and other gear, arranged more or less parallel and at a short distance from the strands of the antennæ, must be effectively broken by insulators of high mechanical strength in such a way as to avoid any appreciable absorption of energy.

(*f*) *Tension of Antenna Stays*.—Care should be taken against stretching the stays too tightly so as to avoid antennæ being torn away in consequence of severe vibrations of the mast-head caused by explosion, collision, etc.

Art. 4.

Electric Generating Group.

Every electric generating group must be constructed and arranged so as to maintain continuous service.

(*a*) *Ship's Regular Generators*.—If there be machinery on board for lighting the ship, etc., it can equally well serve for supplying energy to the wireless station, provided that when all the apparatus for which it is normally employed is being served there remains an ample supply of electric power for working the radiotelegraphic installation.

(*b*) *Special System*.—For this purpose it is necessary to choose a very rigid system of construction which is not liable to derangement by powerful shocks and which can be quickly connected up. No systems of electro generation shall be allowed which do not possess a minimum power of 2½ kw. with compound excitation on the dynamo, machines of less power not being of the requisite robust qualities. A power of 2½ kw. must be exclusively reserved to the wireless station and contingently to the lighting of the wireless cabin. In the interests of the safety of the ship the electric generating group must be placed as far as possible in the upper part of the machinery room, or, if it consists of an internal combustion motor, in the immediate neighbourhood of the wireless telegraph station, but so situated that working does not interfere with the operator.

(*c*) *Working*.—The electric generating system shall work continuously throughout the voyage and the current must be always at the disposal of the operator.

In every gang of engineers one of them must be specially told off to conduct and maintain the electric generating system, and this duty must not in any case fall upon the operators

(*d*) *Voltmeter*.—The switchboard belonging to the electric generating system must include an absolutely reliable voltmeter and ammeter.

Art. 5.

Location of the Wireless Telegraph Station—Cabin.

(*a*) *Location*.—The wireless station must be installed whenever possible on the upper bridge, not too much towards the stern of the ship because the revolutions of the screw produce vibrations which hinder the reception of feeble signals. As far as possible a location shall be chosen free of smoke-stacks, chains, metallic fitments and, as far as possible, out of reach of the waves.

(*b*) *Cabin*.—This must be solid and well built, perfectly watertight and of a sufficient size to comfortably contain the apparatus, and to serve in case of need as quarters for the operators, besides being sufficiently sound-proof to allow of the reception of faint signals.

The motor alternator system of the sending station must be enclosed in a cupboard sufficiently sound-proof to prevent the noise made by its revolutions interfering with reception; the latter ought to be possible without involving any stoppage of the generating machine.

It is advisable to quarter the operating staff in the wireless cabin. This arrangement allows of the most rapid action in case of mishap and consequently affords greater security.

If circumstances do not permit operators to have their bunks made up in the wireless cabin, choice shall be made for their location in a position as near as possible to the wireless station and on one of the upper decks.

The cabin must be fitted with an emergency lighting system independent of the ship's electric generating set, petrol lamps, candles etc. The operator must always have ready to hand means for getting a light. A ship's lantern must be at the disposal of the operator in the wireless cabin, so that in case of need he may proceed during the night to overhaul the exterior apparatus.

Arrangements should be made that no light can, during the night, filter through to the outside, when the doors of the wireless cabin are opened. (Thick black curtains should be used or automatic light stoppers, operating as soon as the doors are opened.)

The wireless cabin shall be fitted with a ship's chronometer which must always show Greenwich mean time. (G.M.T.)

Easy and rapid access to the roof of the wireless cabin must be provided by an iron ladder so as to enable ready verification of antennæ connections, lead-in insulators, etc.

It has been observed that submarines when bombarding a vessel generally endeavour to destroy the wireless cabin at the first opportunity. These cabins are conspicuous on account of the outline formed by the insulators leading down from the antenna. It will be found an excellent precaution to hide these insulators by (*e.g.*) awnings which follow the contour of the cabin and overlap its roof.

(*c*) *Means of Communication.*—The operator must not leave the wireless cabin and abandon his listening-in, in order to receive a communication from the officer on watch, or in order to hand to him a message which he has received, or to ask for current, etc.

It is equally necessary that a third party shall not intervene in the transmission of these messages, such a course being always liable to lead to dangerous errors.

A telephone or speaking tube must therefore be erected between the wireless cabin and the bridge.

If the operators have their bunks fitted in a place apart from the wireless cabin, an electric bell shall be installed in their state room with a push in the wireless cabin, so as to give the radiotelegraphist on duty an opportunity of summoning his colleague.

If there be only a single operator, and if he sleeps in a separate cabin, an electric bell shall be installed in that cabin with a push on the bridge, so as to give the officer on watch means for calling the operator when the latter is not on duty.

All these means of communication must invariably be kept in perfect working order.

Art 6.

Technical Conditions of Installation.

(*a*) *Erection and Fitting.*—The rapid execution of erection under present conditions must not interfere with the elementary precautions of assuring the efficient working of the wireless station and providing against risks of short-circuiting and fire.

The connections must also be carefully made by means of a flexible cable insulated by two layers of vulcanised rubber, the whole covered with lead, with an insulation resistance of at least 600 megohms per kilometre. This cable shall moreover be mechanically protected by a tube of iron or steel in every part where it is exposed to deteriorating influences.

A special line leading from the switchboard of the electric generating group shall furnish power to the wireless station. No other circuit must be connected up with this line except, in cases of emergency, a lighting circuit for the wireless cabin. Fuses must in this case be inserted in order to protect the lamp or lamps. A bi-polar interrupter and contact-breaker must be placed:

(*a*) In the machine-room, on the switch board of the electric system in the special circuit serving the wireless station.

(*b*) Within the wireless station itself in the circuit carrying the continuous current.

(*c*) Within the wireless cabin in the alternating current circuit at the ends of the alternator.

In the case of the two contact-breakers placed in the continuous feed circuit, the one on the switchboard of the electric generating system, and the other in the wireless cabin, the former must be considerably stronger than the latter in order to avoid its replacement with fusible material when faulty manipulation (or some accident to the wireless instruments) results in the melting of the fuses in the wireless cabin.

The switchboard of the wireless station shall be fitted with the necessary measuring instruments for observing the working of the machines and the wireless apparatus.

Nevertheless, it is permissible to replace continuous and alternating current voltmeters on this switchboard by pilot lamps of appropriate voltage.

The continuous current voltmeter—or the pilot lamp which takes its place—must give the operator constant opportunity for assuring himself that the generator is in working order and that there is no interruption in the circuit which feeds the wireless station.

(*b*) *Machines—Low Frequency Circuit.*—These machines and this apparatus must be very carefully insulated between the windings and between the windings and the frame. They must be submitted to a test for dielectric strength under a continuous voltage of 1,000 volts applied for five minutes when cold.

(*c*) *High Tension Apparatus.*—The insulation must have and must preserve a high degree of efficiency. This apparatus must be able to stand the following test:—The sending station must be operated with the antenna circuit disconnected, and with each terminal of the secondary of the transformer earthed in turn for a period of five minutes, together with its core and metallic casing. Both machines and instruments must be effectively protected against any excess of strain due to the high frequency circuits.

(*d*) *Accumulator Batteries.*—It is strictly forbidden to switch any circuit whatsoever—lighting, ventilating, etc., on to the accumulator batteries of the principal set, or on to the battery of the emergency set, or to transfer any units of the battery elsewhere; these must never be used, for instance, for lighting purposes during a temporary stoppage, etc.

The only allowable exception consists of the connecting on to the battery of the principal set—if such a source of supply be utilised for that set—a pilot lamp of 20 watts at the maximum which takes the place of a volt meter. Any such lamp must be protected by a special double-pole fuse.

No pilot lamp may under any circumstances be fitted on the battery of the emergency set.

Operators are held personally responsible for any misuse of their batteries.

The batteries of accumulators must always be kept completely charged during the voyage. This complete charging must be effected before departure, and if necessity arises they must be

re-charged every day, or every other day, according to the amount of use that has been made of them.

The accumulator switchboard must include:

(a) An ammeter showing the strength of the charging and discharging currents.

(b) A well-calibrated voltmeter connected to the terminals of the battery.

So far as the battery of the emergency set is concerned it is always permissible to omit the ammeter when the charging current is automatically limited to one or two values determined by the introduction of fixed resistances in the circuit.

Since the battery of the emergency set is very seldom at work care must be taken to ensure its maintenance in good order.

For this purpose a special apparatus must be provided for discharging the battery through a resistance.

This dischage shall be carried out at Ports of Call, and care must be taken immediately afterwards to recharge the battery completely.

Steps shall be taken to make sure of the preservation in good order of the batteries during the periods when the ship's dynamo has stopped working.

(e) *Syntonisation.*—Regulations against sending out signals in the larger number of allied ports and in certain neutral ports plainly renders difficult a proper tuning up of the ship's station after installation.

Nevertheless, it is easy to effect an approximate syntonisation without infringing the above-mentioned regulations by simply exciting the aerial with the help of a suitable buzzer. It is, therefore, formally recommended that this buzzer tuning method shall be used after installation, preparatory to the operation being completed after the ship has left the port. The operator will be guided in these tests by the reading of his antenna ammeter.

This syntonisation must be made for each of the two regular wave lengths (300 and 600 metres) and for each of the three antennæ, the regular, the single strand, and the emergency.

Tables clearly indicating the different tuning adjustments must be posted up in the cabin in clear view of the operator.

(f) *Plans of the Connections—Working Arrangements.*—Amongst the documents carried by the station, there must be included detailed plans of the connections of the installation and of all the apparatus, with the object of helping operators in looking for and rectifying any faults that may occur.

Radiotelegraphists must thoroughly understand the working of their station. They must practice themselves in establishing instantly, and without experimentalisation the necessary connections for bringing into action the emergency set, the emergency aerial, different wave-lengths, etc.

Art. 7.

Operating Personnel.

(a) *Nationality.*—The Belgian Government established on the 4th May, 1917, the following regulations concerning the nationality of the operating staff:—

(1) The radiotelegraphic stations of Belgian ships must be served, in principle, by operators of Belgian nationality.

(2) In default of Belgian operators the owners of stations may, at their own responsibility, and with the previous authorisation of the Belgian Government, have recourse to subjects of Allied nationality to the exclusion of neutral subjects, until they have been able, with as little delay as possible, to replace them by Belgian subjects.

(3) It is only quite exceptional that a neutral operator will, under any circumstances, be allowed to fill a post on board. A specific request must be made in advance, if need be by telegram, and the owner of the station must furnish detailed references. He will be held responsbile for any acts that may be committed by this employé.

In any case, any such authorisation will be valid solely for a single trip.

Demands for emergency authorisation must, if need arise, be addressed to:—The Administrator of Belgian State Telegraphs, Radio-telegraphic Service, 15, Place de l'Hotel-de-Ville, Le Havre, France. The telegraphic address of which is:—Service Radiotelegraphique Etat Belge, Le Havre.

(b) *Qualification.*—Every operator, whatever may be his nationality, in service on board Belgian ships must possess the Belgian Radiotelegraphic operating licence of the first class, and have a good working knowledge of English

(c) *Physical Qualifications.*—The special character of the service in times of war constitutes a complete bar against the employment of any operator not completely robust, or in full possession of all his limbs, or *in fine* anyone who is not physically perfect.

(d) *Disciplinary Measures.*—If an operator gives cause for any reasonable complaint on the part of the Belgian, or Allied Authorities, on the part of the owner of the ship, of the captain, of the owner of the Station, etc., with regard to any misdemeanours committed in the course of the execution of his service, he may be disqualified, either temporarily or for the duration of the war, his licence being suspended for the period of his disqualification. A notice thereof will be sent to the Minister of the Interior if the individual so affected proceeds to appeal. If he has been suspended without pay from his functions as Radiotelegraphist on Board Belgian ships he will immediately be placed at the disposal of the military authorities.

Operators are, moreover, subject to the Disciplinary and Penal Code of the Mercantile Marine.

Art. 8.

Organisation of the Service.

(a) *Listening-In.*—During the whole length of the voyage listening-in must be completely continuous. This can only be assured by relays of two operators in watches of four hours on and four hours off. The operator on watch may not even temporarily quit his post in case of urgent need without having been replaced by his colleague not on duty. Nevertheless, if the supply of qualified operators belonging to Belgian, or Allied nations, shall be temporarily insufficient, the owner of the ship may be exceptionally authorised to have the service carried on by a single operator. This latter must in that case so organise his listening-in as to receive all the war warnings which may affect the navigation of the ship, as well as radiotelegraphic time-signals at least once in the 24 hours.

Such an authorisation as this must be applied for to the Department of Railways, Marine, Posts and Telegraphs. The person so applying must state the probable period which will elapse before he can recruit or train a second operator.

(b) *Carrying out of the Service.*—For the

carrying out of the Radiotelegraphic Service operators are placed under the supreme authority of the Commander of the vessel.

They are strictly forbidden to send out signals of any sort, or to answer a signal, even one of distress, without the authorisation or instructions of the officer on watch. They must never answer any station utilising the Telefunken System. No Allied vessel possesses a set of this type.

All transmission—obviously cases of distress excepted—must be made with the smallest amount of power compatible with the circumstances, so as to reduce as far as possible the zone in which the signals may be picked up by enemy sets, thus enabling them to determine the position of the ship.

All executive messages relating to navigation, as well as all distress signals, must be brought with all speed to the knowledge of the officer on watch ***exactly as they stand*** ; the operator must never undertake to judge whether a message of this kind does, or does not, affect the navigation of his ship, the commander alone is the arbiter in such a matter.

Itinerary.—The operator on watch must make himself acquainted with the itinerary, the position and the course of the ship.

(*c*) ***Duty in case of Distress.***—In the case of accident, explosion, etc., the operator, or operators, must immediately test their instruments to see if they are still in good working order. If the current of the ship's generator has failed they must switch on, without loss of time, the connections of the emergency set and test their antennae. If the principal antenna be out of order, and if time presses, they must link up their gear with the emergency antenna, taking care to free it, whenever necessary, from all metal contact which may earth it, or from the principal antenna.

A trial with the auxiliary coil with direct excitation (plain aerial) will immediately inform the operator with regard to the quality and insulation of the antenna.

In a word, he must act in accordance with circumstances, so as to be able to send out his signal with the smallest possible delay; the gain of a few seconds may save the lives of all the passengers. It is only if the Captain considers that sufficient time is available, and if the emergency antenna be not in sufficiently good order, that the operator may proceed to repair the principal antenna, switch on the single strand antenna, or even erect a makeshift antenna.

As soon as a set is ready to send, he must advise the Captain and ask for orders, getting them ***confirmed in writing,*** and these orders must be followed exactly.

It is the paramount duty of the radiotelegraphist not to abandon his post so long as there is any possibility of sending or receiving; unless the Commander has given him the order to do so in view of the imminent abandonment of the ship.

(*d*) At sea the operator must be ready at any moment to send out signals of distress with the smallest possible delay and with the maximum of energy and efficiency that the circumstances permit; he will make his arrangements accordingly. Thus for instance in the event of damage being done to the aboard ship generator or to the principal set the emergency gear must be put into working operation.

No distress call may be radiated without the express order of the commander of the ship. It is absolutely necessary that the operator should remain collected at the critical moment of action, mishap or an attack. Upon him may depend the lives of all the passengers to say nothing of his own as well as the preservation of the ship and its freight.

He must never lose sight of the fact that it is useless to send out a distress signal without its being accompanied by the name of the ship in full and as exact an indication as possible of its position. The form of the distress call must follow strictly the instructions of the Naval Authorities in charge of all commercial ships.

Every positional error or change of position must also be radiated.

If an operator receives no answer to his distress calls he must repeat them with intervals of listening-in, and on each emission must recapitulate all the needful particulars. Should the operator conclude that his appeals are vain he should send out a new series of calls after having proceeded in the following manner. Considerably amplify the coupling between the primary oscillation circuit and that of the antenna so as to obtain an impure badly tuned and more damped emission, which stands the chance of affecting the reception of a larger number of stations and consequently of being picked up. It must be remembered, however, that the range of such an emission is less than that of a properly syntonised call. Recourse may also be had on occasions to the emergency gear with induction coil acting on a plain aerial.

Ship's Register.

(*e*) On every ship the operators should keep a register with numbered pages in which they will progressively enter the following particulars —showing the time in G.M.T. and the name of the operator on watch :—

(1) The start and finish of the watch of each operator as well as any interruptions, their duration and their cause.

(2) Any faults which may occur in the transmitting or reception gear, any lack of current, etc.

The nature and the cause of these mishaps must figure in the report, as well as the duration of the resulting interruption.

(3) The result of the periodic experiments conducted or some mention of the reason for which they have not been made.

(4) A record of all communications carried on with foreign stations and which did not affect their own ship.

It will suffice to make a simple record which will allow later on of these communications being reconstituted and identified. For example :—

17 h. 53 ABC de XYZ—27 mots code mqzr dvpy....

17 h. 56 XYZ demande repetition depuis hdpz, etc., etc.

(5) The complete text of all messages received regarding the navigation of the ship and communicated to the officer on watch.

(6) All distress calls picked up.

(7) The exact text of every message sent.

(8) If possible and if stations permit, in the case of accidents enter all details relative to the execution of the radiotelegraphic service (distress calls, replies, steps taken for safety, etc.).

An operator is forbidden to enter in the steamship register any translation into plain language of a coded text. His register must, moreover, be verified and checked every day by the commander of the ship.

This register being by its nature essentially

confidential must only be handed over to the Belgian and Allied authorities.

In the event of disaster operators must endeavour to save their ship's register, and if there be any risk of its falling into enemy hands they must throw it into the sea.

Account of Accident.

(*f*) In the event of its being necessary to abandon ship, or if the operator or operators are able to preserve their steamship register, they must address it to the Administration of Belgian Telegraphs at Havre through the intermediary of a Belgian Consul residing in the neighbourhood of the port at which they are disembarked. This register must not be sent by post. Whether the register has been sent or not, the operator (or operators) must in addition indite with as little delay as possible a report giving, with specific mention of dates and times, every detail relating to the execution of the radiotelegraphic service both before and after the accident (distress calls, life-saving procedure, etc.).

Mention must be made of what has happened to the ship's register, and if circumstances permit this report must be submitted by the operator, or operators, to the captain for his signature and he will make thereon any observations which he thinks fit. This document shall then be addressed by registered post to :—
l'Administration des Télégraphes belges Ministères belges, Le Havre (France).

Allocation of Operators.

(*g*) In the interest of the security of navigation it is well to maintain as far as possible the allocation of an operator to a specific ship or at all events to ships which ply under the same conditions, i.e., between the same ports or countries.

Regard may be had for the purpose of this rule to temperaments in certain cases; for instance, it is advisable to consider the necessity of relieving operators navigating in tropic seas after long enforced idleness of a ship, or after illness, accident, leave, etc.

Confidential Character of Wireless Messages.

(*h*) Every operator must have taken the oath of observing the most absolute secrecy with regard to wireless communication under the penalty of Articles 149 and 150 of the Belgian Penal Code.

The attention of operators is expressly directed to the point that in time of war any detail relating to the radiotelegraphic service is of a character essentially confidential; every indication relative to the manner of framing and transmitting certain messages, to the presence of certain ships, to the routes followed, to convoys and their escorts, to distress calls, to sinking, etc., *in fine* everything which concerns navigation, must remain absolutely secret.

Every indiscretion coming to the ears of the enemy may have the most serious consequences.

The utmost discretion is therefore necessary, and more particularly in neutral countries and in the presence of neutral subjects—*including amongst them their wireless men.*

ART. 9.

Maintenance and Investigation.

Operators are responsible for the maintenance of radiotelegraphic installations. The commander of the ship must accord them the help of the personnel on board necessary for the investigation and upkeep of antennæ apparatus, etc.

Every part of the radiotelegraphic installation must be constantly maintained in perfect order, special care being given where such parts are subject to high tension.

Periodic Tests.

(1) Twice a day, morning and evening, a test shall be carried out of the principal transmitting set and of the emergency set in local circuit; that is to say, the antenna being disconnected. This test (signals or continuous sending) shall last for the length of time which the operator judges necessary to make sure that all is in order.

(2) Every unnecessary message is forbidden on the high seas. In order to make certain of the satisfactory working of the station (including radiation and insulation of antennæ) opportunity shall be taken at the moment of starting the voyage for proceeding rapidly and at irregular intervals to the following emission tests.

Choice must be made of a time when the traffic between neighbouring stations is small and care must be taken not to choose the hours when war warnings are being issued. These tests shall be reduced in duration to the minimum. They shall proceed as follows :—
(*a*) With the principal set on the principal antenna send out a call of a few seconds ; the deviation of the amperemeter of the antenna will allow an operator to judge immediately if the installation be working well (it is unnecessary to keep up this sending until the needle of the apparatus becomes absolutely motionless). (*b*) With the coil of the emergency set excite the principal antenna in plain aerial ; a long white spark strong and crackling will indicate that the insulation of the antenna is good, the emission of short sending will suffice. (*c*) Make the same test to verify the insulation of the emergency set.

(3) Make a daily verification of the spare detector.

In case of any parts of a machine or apparatus being found to be out of order take steps to remedy this at once. Never leave it over for later on.

ART. 10.

Spare Material—Gear.

(*a*) *Spare Material.*—The Radiotelegraphic Station must contain the following material :

(1) A complete transmitting condenser (primary circuit) of a fixed capacity and ready for service.

(2) An aerial lead-in insulator (or a spare tube).

(3) Antenna wire, insulators and accessories in sufficient quantity for the construction of a new main antenna.

(4) A telephone with double headgear and two leads.

(5) A galvanometer for the testing of circuits

(6) Various wires and ropes.

(7) Various accessories and spare parts, etc.

(*b*) *Gear and Tools.*—The operators must have at their disposal an ample supply of tools, especially such as are necessary for soldering antennæ and apparatus ; their tool chest must contain *inter alia* a hydrometer for verifying the density of the accumulator electrolyte, and a portable and accurate voltmeter graduated from zero to 3 or 4 volts in order to measure the individual cell voltages.

ART. 11.

Special Arrangements.

On board ships coming under this category absolutely special precautions must be carried out.

☞ The wireless cabin must *de rigueur* be located on the upper deck and built in such a way as to be distinct and airy; the insulation of the antennæ and of the metallic stays must, moreover, receive special attention.

Supplementary precautions may be imposed in accordance with circumstances.

ART. 12.

Various Arrangements.

Modifications to Installations.—Ship installations must not be modified without the previous assent of the Department of Railways, Marine, Posts and Telegraphs.

Nevertheless, in case of partial (or total) incapacity for working, a new installation may be temporarily erected, provided that it conforms with the conditions imposed for the authorised station.

A new request for authorisation must be sent in without delay, wherein shall be set forth the necessity for having carried out any modification of the installations approved.

The licencee of a board-ship station (*i.e.*, the holder of an authorisation to install, or of a sea-going radio licence) is obliged at all times to follow the instructions given by the Department of Railways, Marine, Posts and Telegraphs, in whose control are vested all ships' stations, and to carry out within the specified times all modifications or additions which are judged necessary, not only with regard to installations and apparatus but also with regard to the manning, qualification and service of the operating personnel.

At need, the Department above mentioned shall carry out, or cause to be carried out, at the expense of the owner, all testing, repair, modification, or addition of which the execution is judged necessary to ensure good working of the installations or the safety of the ship, without any responsibility under this heading being incurred by the State.

Lifebelts.—The wireless cabin, whether or no it serves as the operators' state room, must contain for each of the radiotelegraphists a lifebelt of an efficient and approved type.

Other life-saving apparatus of the same character shall be at the disposal of operators in the places in which they are located if they do not sleep in the wireless cabin.

These life-saving appliances must be always kept in perfect order.

ART. 13.

Measures of Discipline and Control.—The officials of the Belgian Government duly appointed for that purpose have, at all times of the day or night, not only in Belgian territorial waters, but outside those waters, as well as on board Belgian vessels in foreign ports, free access to the installations of the authorised ship station and free disposal of the documents relating to the service of that station.

The owner (that is to say, the holder of an authorisation for installation or of a radiotelegraphic licence) as well as his representative, employees, charterers, captains, officers, operators, masters and personnel are bound to facilitate by every means the work of supervision and control vested in these officials.

Under its controlling rights, the Department of Railways, Marine, Posts and Telegraphs may demand that the wireless register of the ship be forwarded to it.

Access to the Wireless Cabin.—Access to the wireless cabin is strictly forbidden to the personnel of the ship, except in such cases where access is necessary for the purposes of duty; and the same interdiction applies to any foreigner with the exception of the authorised naval authorities of Allied Powers.

In the absence of the radio officers, the cabin must be locked up after the windows have been closed on the inside, the key shall be handed to the commander of the ship or, in his absence, to the chief officer.

INFORMATION TO BE FURNISHED IN THE REQUESTS FOR AUTHORISATION APPERTAINING TO RADIOTELEGRAPHIC STATIONS.

ART. 14.

Applications to be sent, under registered cover, to the Minister of Belgian Railways, Marine, Posts and Telegraphs, at Sainte-Adresse, Seine-Inferieure, France.

(*a*) *Where a Ship is not already furnished with Wireless* :—

Application.—Social status, name, Christian names; address in Belgium; present address.

Ship.—Name, method of propulsion (steamer; sailing vessel, motor launch), net tonnage, speed, business, itinerary, whether carrying passengers regularly or occasionally; whether on occasion freighted with volatile and inflammable goods.

System of Apparatus.—What system of apparatus do you purpose installing on board your ship? Name and address of the supplier of the installation and apparatus. Name and address of the exploiter of the station.

Nature of the Installations.—Here give a description of the various parts and arrangements of the proposed installation, with plans of the connections and apparatus.

[N.B.—Descriptions and plans must be of such a character as to indicate whether the proposed installations conform to the prescribed conditions.]

The power available at the terminals of the wireless alternator (voltage and current); frequency of current.

Number of sparks per second.

Minimum range by day of the station as estimated by the supplier.

Constitution of the emergency set.

Accumulator battery of the emergency set, number of cells, type, voltage, capacity, in ampere-hours.

Does the sending set include a battery of accumulators?

Number of cells, voltage capacty in ampere-hours.

Antennæ.—The form and approximate dimensions of the main antenna. How is it proposed to install the emergency antenna? Where will it be fixed? Its shape and approximate dimensions.

Electric Generating System.—If an electric generating system exists on board, show what kind of motor it carries (steam, petrol, etc.)

Power, voltage, and method of excitation for the dynamo.

The power available for feeding the wireless station.

Where is this electric generating system located?

If it is necessary to install a special electric generating system :—

Name and address of the firm which supply it.

A description and plan of the system, type of motor (steam, petrol, etc.).

Power, voltage and method of exciting the dynamo.

Erection of the Station.—Where is it planned to install :—

(*a*) The wireless cabin (are you constructing a special cabin or are you adapting one

already existing) ? On what deck ? In what place ? (Here add a plan and elevation).

(*b*) The accumulator battery.

(*c*) The electric generating system (if a separate system is necessary).

(*d*) Operators' quarters.

Operating Personnel.—What qualified persons have you available to work your station ?

Time for Erection.—How long a period do your suppliers need for the delivery of the material and for installing it on board your vessel ?

About what time and in what port will this installation be set up ?

The Proposed Signalling Arrangements.—Call letters—normal range in nautical miles. Wireless system and the character of emission. Wave-lengths. Nature of services. Hours of service.

Board ship charges : per word in francs.

Board ship charges : minimum per radiotelegram in francs.

(*b*) ***Where a vessel is already furnished with a wireless station that requires modification or completion in conformity with the stipulations of the present regulaion.***

Applicant.—Social status, name and Christian names; address in Belgium; present address.

Ship.—Name, method of propulsion (whether steamer, sailing boat or motor-launch), net tonnage, speed, nature of traffic, itinerary ; whether it regularly or occasionally carries passengers; whether on occasion freighted with volatile and inflammable articles.

System of Apparatus.—What is the system of apparatus installed on board your ship ? Name and address of the supplier and of the installer of this apparatus. Name and address of the exploiter of the station.

Nature of the Installations.—Add a description of the various parts and make-up of the existing installation with a plan of its connections and apparatus.

What are the modifications you propose introducing to put it in accord with the conditions of the present regulation ?

[N.B.—Descriptions and plans must allow of its being seen whether the installation and proposed modifications are in conformity with the new conditions laid down.]

Power available at the terminals of the alternator (voltage and current) ; frequency of the current.

Number of sparks per second.

Minimum range by day of the existing station.

Is there an emergency set ? What is its constitution ?

The accumulator battery of the emergency set, the number of cells, type, voltage, and capacity in ampere-hours.

Does the principal set include an accumulator battery ?

Number of cells, type, voltage, and capacity in ampere-hours.

Antennæ.—Form and dimensions of the principal antenna.

How is it proposed to install the emergency antenna ?

Where will it be fixed ? The form and approximate dimensions thereof.

Electric Generating System.—What sort of motor does it carry (steam, petrol, etc.) ?

Power, voltage and method of exciting the dynamo.

What is the power available for feeding the wireless installation ?

Is the electric generating set installed to serve solely the wireless station ? Or is it to supply the lighting of the ship, electric motor-pumps, ventilators, etc. ?

Where is the electric generating system installed ? On what deck ?

Location of the Station.—Where is it proposed to install :

(*a*) The wireless cabin : on what deck ? at what point ? (Include here diagrams in plan and elevation.)

(*b*) The accumulator battery of the emergency set, as well as that of the principal transmitting set (if it carries one) ?

(*c*) Operators' quarters ?

Operating Staff.—What qualified persons have you at your disposal for working the station ?

If you have on board only a single Belgian operator, how soon can you arrange to have the station worked by a second Belgian radiotelegraphist, or provisionally by one of Allied nationality ?

Time Occupied by the Modifications.—How long do you estimate your suppliers and workers will take in modifying and completing your installations to accord with the conditions of this new regulation ?

About what date and in what port will these modifications probably be carried out ?

F APPLICATION OF THE DECREE OF THE 10TH SEPTEMBER, 1918, RELATIVE TO SHIPS' LICENCES.

CIRCULAR NO. 1.

The attention of shipowners is directed to the fact that in pursuance of Article V. of the Decree of the 10th September, 1918, relating to shipping licences, Belgian vessels of 1,500 tons or over must be fitted with a radiotelegraphic station for the transmission and reception of ether messages through the agency of a competent personnel. The erection of these stations, their constitution, their operation, their supervision, etc., are regulated by international agreements and by Belgian laws and regulations in matters of radiotelegraphy

With as little delay as possible, and at latest before the 15th November, 1918, every owner of a vessel liable to the above-mentioned obligation must, in conformity with Article I. of the Royal Decree of November 1913, deposit under registered cover, addressed to the Department of Railways, Marine, Posts and Telegraphs of the Belgian State, located at Sainte-Adresse, Seine Inferieure, France, a request for authorisation to install a radiotelegraphic station.

ONE SEPARATE REQUEST MUST BE MADE FOR EACH VESSEL.

Directions with regard to the particulars necessary to be furnished in such requests for authorisation will be found at the close of the administrative regulations affecting wireless telegraphy, dated 15th October 1918.

The Department of Railways, Marine, Posts and Telegraphs, having regard to national interests and to the arrangements concerning apparatus and operators, shall settle the order in which vessels shall be fitted with their radiotelegraphic station and shall assign to each one of them the date at which it shall be completely installed and in a perfect condition for working.

The attention of shipowners is specially directed to the conditions of Articles 1 and 2 of the Royal Decree of the 3rd November, 1913 which will be very strictly enforced. The

authorisation for making installations must be obtained before any measure can be taken by the interested parties with the object of initiating the work.

A radiotelegraphic licence shall be granted to the owner of a vessel when the installations have been recognised as conforming to the conditions imposed. This licence will be granted for one or several voyages, or for a certain fixed period. It will be cancelled if it be established at any moment that the installations have not been set up and worked in accordance with the conditions stipulated in the licence or in a later regulation.

The licencee (one who benefits under an authorisation for a wireless installation or of a radiotelegraphic licence) shall be bound at all times to follow the instructions given him by the Department of Railways, Marine, Posts and Telegraphs, and must carry out within the specified period all modifications or additions which are judged necessary, both with regard to installations and apparatus, so far as concerns its material, and the qualification and service of the operating staff.

Whenever needful the above-mentioned Department shall initiate, or shall cause to be initiated, at the cost of the licencee, any verification, repair, modification or addition which may be judged necessary to ensure the satisfactory working of the installations or the security of the ship without involving any responsibility therefore on the part of the State.

Except with special permission previously obtained, board-ship stations must be worked by specialised operators of Belgian nationality.

Telegraph Administration.

No. 1665 R.

Dated at Havre, 21st October, 1918.

CIRCULAR LETTER TO SHIPOWNERS WHOSE VESSELS ARE ALREADY FITTED WITH A RADIOTELEGRAPHIC STATION.

GENTLEMEN.—Article V. of the Decree of the 10th September, 1918, relating to ships' licences makes the granting of these permits subject to certain conditions affecting the manning and conditioning of the ship.

The Circular No. 1 addressed to shipowners has brought to your notice that, in conformity with Article V. above, every Belgian seagoing vessel above 1,500 tons net must be fitted with a radiotelegraphic station in charge of a competent staff.

You will have found annexed to the Circular in question the text of certain arrangements which regulate the erection, working and conduct of the stations.

The Decree shall come into force on the 15th October, 1918. A certain amount of delay will be allowed you for modifying the radiotelegraphic installations already in existence on board Belgian vessels and to complete the engagement of the operating staff in accordance with the stipulations of the Belgian administrative regulations with regard to radio-telegraphy under date of the 15th October, 1918.

On the expiry of these delays all wireless authorisations or licences issued previously will expire and be cancelled.

Kindly forward with as little delay as possible and at latest by the 15th November, 1918, under registered cover, addressed to the Department of Railways, Marine, Posts and Telegraphs, located at Sainte-Adresse, Seine Inferieure, France, a fresh request for authorisation with regard to radiotelegraphy. *A separate request must be made for each ship.*

Directions as to particulars you are required to furnish in your request for authorisation will be found at the close of the Administrative Regulations dated 15th October, 1918.

After examining your request I will let you know the length of time granted you for installing and working your present station under the rules newly imposed.

A fresh radiotelegraphic licence will be granted to the ship as soon as we have verified that these conditions are fulfilled.

In order to guard against mistakes and loss of time, all correspondence relating to radiotelegraphic installations (requests for particulars, personnel, licences, etc.) must be addressed directly to:

Service de Radiotélégraphie de l'Etat Belge
Administration des Télégraphes,
15, Place de l'Hotel de Ville,
LE HAVRE (France);

and telegrams to:

Service Radiotélégraphique Etat Belge
LE HAVRE (France).

Please acknowledge receipt of this letter.

Your obedient servant,

(Sgd.) Belgian Inspector-General to Telegraphs for Minister of Marine, Posts and Telegraphs.

BERMUDAS (THE)

A BRITISH Colony with representative Government, consisting of a group of 360 small islands (about 20 inhabited) the Bermudas lie 520 miles east-North Carolina and 677 distant from New York. They are noted for their climate and scenery and constitute a favourite winter resort for Americans. The area is a little under 20 square miles, and the capital city is Hamilton.

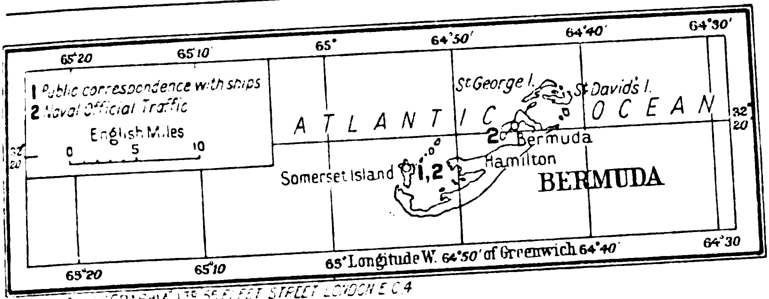
ADMINISTRATION.

There are two wireless stations working in the Colony. Wireless telegraphy is administered under the following enactments:—

A—The Wireless Telegraph Act, 1903.
B—The Wireless Telegraph Act, 1909.

THE WIRELESS TELEGRAPH ACT, 1903

A From and after the passing of this Act it shall not be lawful for any person in these islands to transmit or receive messages across the seas *(by an Act of 1910 this was amended by the addition of the words " or between places in these islands ")* by means of any wireless telegraph, or to install, erect, construct, establish, or maintain in these islands any instrument, apparatus, or other thing for the purpose of transmitting or receiving such messages, unless such person



shall hold a written licence from the Governor authorising the same, and such licence shall be in force and unrevoked; and any person who shall offend against the provisions of this enactment shall be liable, on summary conviction before any two justices, for a first offence to a penalty not exceeding £25, and for a second or subsequent offence to a penalty not exceeding £100.

2. Any licence issued by the Governor under this Act may at any time be revoked by him by a written notice given to the person to whom such licence was issued, or by the publication of such revocation in the *Gazette*, and after such revocation such person shall not be entitled to any privilege or protection by virtue of such licence.

3. Any licence under this Act may be issued subject to such conditions and restrictions as the Governor may from time to time consider desirable in the public interest.

4. If any Justice of the Peace shall be satisfied from the information on oath of any credible person that there is good reason to believe that any of the provisions of the first section of this Act have been or are being violated, he may issue a search warrant to any constable or constables authorising and requiring him or them, with or without assistants, at any hour of the day or night to enter into, and go through and search, inspect and examine any premises where such violation is suspected to have been or to be committed for the purpose of ascertaining whether such violation has been or is being committed; and if, upon such search, any instrument, apparatus, or other thing apparently used, or capable of being used, for the purpose of transmitting or receiving messages across the sea by wireless telegraphy shall be found, it shall be lawful for such constable or constables to seize and carry away, or otherwise to secure the same; and if, upon a hearing before any two Justices of the Peace, they shall adjudge and determine that any such instrument, apparatus, or other thing, has been used, or is capable of being used, for either of the purposes aforesaid, they may adjudge the same to be forfeited, and such forfeiture may be in addition to any penalty which may be imposed on any person under this Act in respect of such instrument, apparatus, or other thing.

5. Any instrument, apparatus, or other thing which shall be adjudged to be forfeited under the provisions of this Act shall be sold or otherwise disposed of in such manner as the Governor shall direct, and if sold the net proceed of such sale shall be paid into the public treasury, after payment thereout of such reward, if any, as the Governor shall award to the informer, or to any constable or constables executing the search warrant under which such articles were seized.

6. This Act shall continue in force until and throughout the last day of December, 1907. (*By the Wireless Telegraphy Act Continuing Act*, 1907, *the Act of* 1903 *is continued in force indefinitely.*)

The Wireless Telegraph Act, 1909.

BThe Governor having informed the Legislature that a despatch has been received from the Secretary of State for the Colonies drawing attention to the desirability of making Regulations as to the use of Wireless Telegraphy apparatus on merchant ships, whether British or foreign, while in the territorial waters of these islands, it was deemed expedient to confer on the Governor in Council the power to make such Regulations as may be necessary for the purpose aforesaid, and the following Act came into force in March, 1909:—

1. It shall be lawful for the Governor in Council to make regulations as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in the territorial waters of these islands, for preventing such apparatus being worked so as to interfere with naval signalling, or with the working of any wireless telegraph station lawfully established or worked in these islands, or with the transmission of messages between any such station and ships at sea.

2. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters of these islands shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases, or in such cases as may be deemed desirable.

3. Any regulations made under this Act may impose fines for any breach thereof not exceeding £20 for a single offence, and not exceeding £5 a day for a continuing offence, and such fines shall be recoverable with costs in any Court of Summary Jurisdiction consisting of any two Justices of the Peace.

4. All regulations made under this Act shall become operative on the date of their publication in the *Gazette*, or on such later date as shall be fixed by the regulations for the purpose.

BOLIVIA

THIS State possesses no seaboard, and, therefore, no maritime stations. The total area of the Republic is reckoned at 703,421 square miles. Geographically it lies between latitude 8° and 23° S., its longitude extending from 57° 30′ to 73° W. The population is estimated at about two and a halt millions. Lake Titicaca, a wonderful stretch of water, about 150 miles in length and breadth and 12,545 feet above the level of the sea, marks the boundary between Bolivia and Peru, and still forms an important means of communication between the countries, although the most direct means of transit consists of the railway between Arica (Peru) and La Paz, the capital of Bolivia.

The Government consists of a President, two Vice-Presidents and five Ministers of State.

CONTROL.

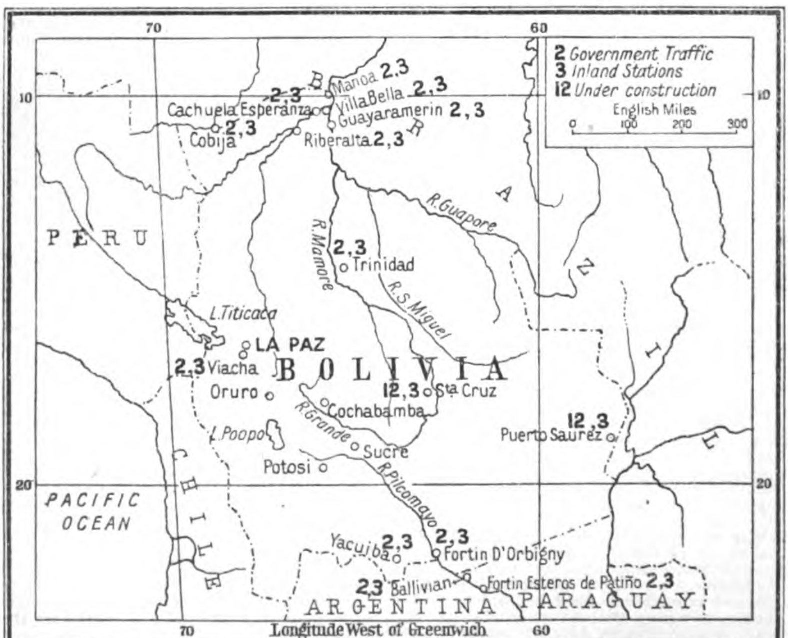
Wireless telegraphy forms at present a branch of the Posts and Telegraphs, which is administered by the State.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Isaac Cariaga Lanza ..	Minister of Government and Public Works ..	La Paz
Mr. Emilio Zalles	Director-General of Posts and Telegraphs	Do.
Mr. Humberto Asin ..	Chief of Radiotelegraphic Service	Do.

ORGANISATION.

Bolivia entered the International Telegraphic Convention on June 1st, 1907, in the fourth category, and gave in its adherence to the International Radiotelegraphic Convention on October 29th, 1915. It takes part in the upkeep of the International Radiotelegraphic Bureau, located at Berne (Switzerland), and the Series of Call Letters assigned to Bolivia by the Bureau are CPA to CPZ.



At present the following stations are in operation :—The station of Viacha, which owing to its proximity to the capital is the first or central station of the Republic. The power is 15 kilowatts, it has four masts of 80 metres each, the working range is 1,200 kilometres during the day, it communicates with the Peruvian stations of Lima and Cachendo, and with the Bolivian stations of Riberalta, Yacuiba, Trinidad, whilst its communications are received at all offices of the Republic. The apparatus was supplied by the Marconi Company, and the service was inaugurated on the 20th October, 1916.

The station of Riberalta, installed by the Marconi Company, has the same power, the same height and number of masts, etc., as that of Viacha, communicating with the Brazilian stations of Porto Velho, Sena Madureira, the Peruvian stations of Yquitos and Cachendo, and the Bolivian stations of Viacha, Cobija, Trinidad, Villa Bella, Cachuela Esperanza and Guayaramerin ; the station has been in operation since October, 1915.

The station of Yacuiba, also, is of the same type as the two previous ones. The work was commenced by engineers of the Marconi Company, and was concluded in August, 1915. Its service with foreign nations is with Asuncion, Paraguay, and it also communicates with Antofogasta (Chile), but its principal aim is to communicate with the stations known as the Pilcomayo stations, owing to their being situated on the banks of that river.

The other stations in order of importance are the following :—Trinidad, the power of which is 6 kilowatts, and system " Telefunken," has a mast 80 metres high, and communicates with the stations of Viacha and Riberalta. It was installed in 1919.

Cobija.—The service of this station was inaugurated on 4th May, 1919 ; it communicates with Riberalta and the Brazilian station of Xapury. Its power is 5 kilowatts, and it is fitted with a mast 80 metres high. The apparatus was supplied by the Marconi Company.

The stations of Cachuela Esperanza, Manoa, Villa Bella and Guayaramerin are of the " Telefunken " system. They have a range of 150 kilometres, their power is 4 kilowatts, and each of these stations has two masts twenty metres in height. They communicate between themselves and with Riberalta and were opened in January of this year.

The stations called the Pilcomayo stations are installed at the small military forts of Ballivian, D'Orbigny and Esteros. That of Ballivian is the first which was installed in the Republic, the date being 21st February, 1914. The system of the three stations is the " Telefunken " and their power is 0·6 (six-tenths of a kilowatt) in the primary, notwithstanding which they communicate perfectly at a distance of 380 kilometres, by day, although in that district there is 90 per cent. of high wood. The height of the masts is 20 metres each, there being two masts to each station.

At each of the 15 kilowatt stations, which communicate between themselves, a chief has been appointed who supervises the personnel of the neighbouring stations of lesser power, for which it has been necessary to create three divisions, which have received the names of Northern, Central and Southern Radiotelegraph Zones. Included in the first are the stations of Cobija, Villa Bella, Cachuela Esperanza, Manoa and Guayaramerin, the chief of which stations is stationed at Riberalta ; to the second zone, viz., the Central zone, belongs only Trinidad, having Viacha as its central station, and finally Yacuiba which is the chief station of the Southern zone, in which are included the stations of Ballivian, fort D'Orbigny and Esteros. Frequently this last-mentioned zone is called the Chaco zone.

A radiotelegraphic school was established during 1917 in La Paz, under the direction of Mr. Asin, the Superintendent of Radiotelegraphy. There are no wireless clubs or societies in the Republic.

ADMINISTRATION.

At present no special laws or regulations have been passed for the adminstration of wireless, but a Bill for that purpose is in course of being drafted.

BORNEO (BRITISH)

Protectorate of Sarawak

THIS semi-independent State lies on the north-west coast of the island of Borneo. Its seaboard is 400 miles, its area 50,000 square miles. The romantic story of how the present hereditary dynasty was initiated under Raja Brooke in 1842 is too well known to need repetition. It is now a British Protectorate, the Civil Service being composed of British officials selected by the Raja.

CONTROL.

The wireless department is in the sole charge of the Post Office, the Postmaster-General having been appointed " Manager " in August, 1916, and the stations having been opened for general use in April, 1917. There are four land stations in Sarawak, all directly controlled by the Government.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
J. R. Barnes	Manager	Kuching
P. E. Cox	Assistant Engineer	Do.
C. S. Were	Chief Operator	Do.
H. G. Gray	Second Operator	Do.
J. M. Hoover	Sub-Manager, Sibu Station	Sibu

ORGANISATION.

Radio communication was instituted by the Government for public and official use in April, 1917. The chief station is at Kuching, the capital of Sarawak, and is of 8 kw. normal. Sub-stations are situated at Miri, Sibu, and Sadong, the two former being of 2½ kw., and the latter ½ kw. The " Compagnie Générale de Radiotélégraphie, Paris," system is employed throughout. An additional station will shortly be erected at Bintulu. All sub-stations communicate direct with Kuching, and the latter with Singapore. All stations are also open for ship communication daily from 0700 to 1700, but special watches for ships will shortly be instituted at the following hours: 0900 to 0920, 1200 to 1220, 2100 to 2120. There is one experimental station belonging to the manager at Kuching; other experimental or amateur stations are allowed, provided the wave-length does not exceed 400 metres.

ADMINISTRATION.

There are no regulations obliging ships trading in Sarawak waters to be fitted with wireless.

British North Borneo

British North Borneo occupies the northern part of the Island of Borneo. The interior is mountainous, Mount Kinabalu being 13,455 feet high, but most of the surface is jungle. Total area 31,106 square miles; coast line 900 miles.

CONTROL.

OFFICIALS CONTROLLING WIRELESS TELEGRAPH OPERATORS.

Official.	*Title.*	*Address.*
Mr. E. C. Roberts	Head of Radiotelegraph Department	Jesselton
Mr. D. A. Dabell	Operator-in-Charge	Sandakan
Mr. A. D. G. Taylor	Operator-in-Charge	Jesselton

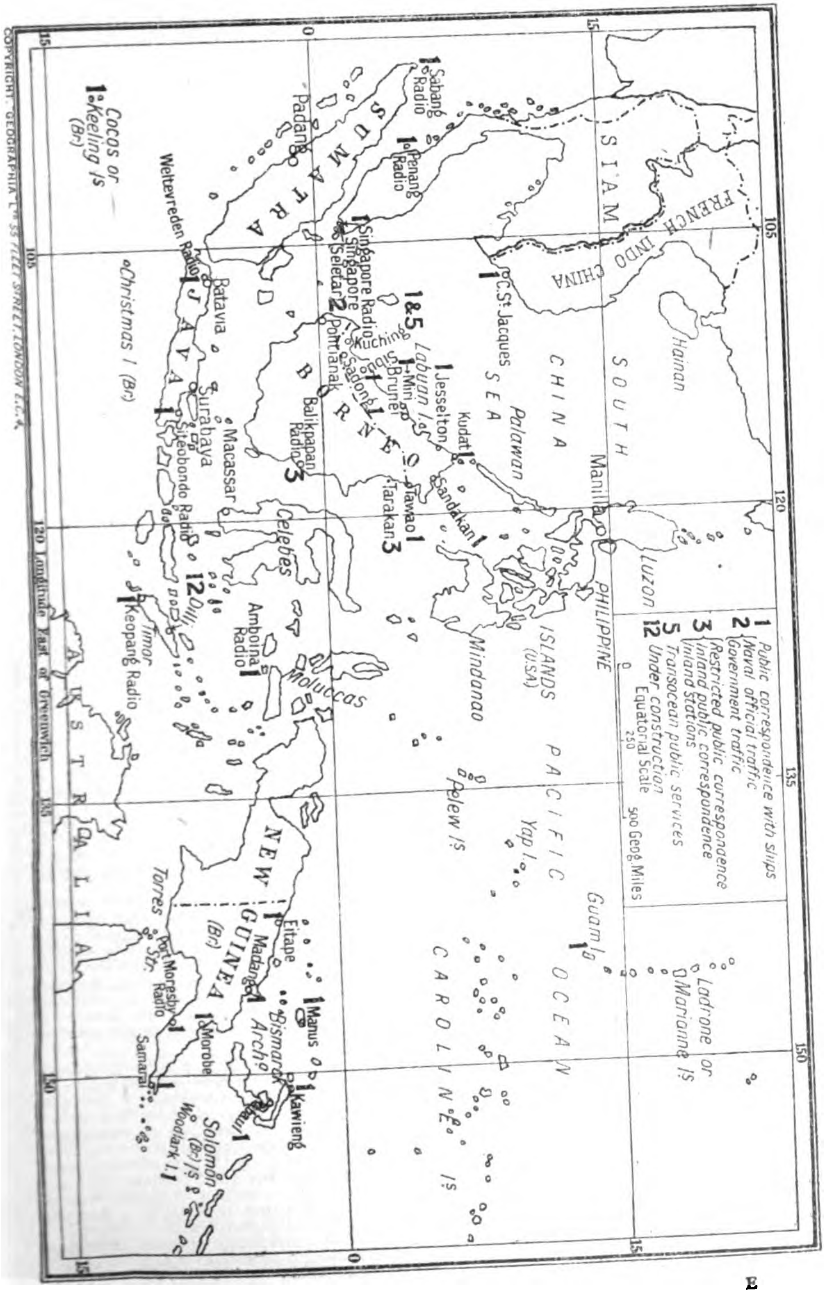
ORGANISATION.

Radiotelegraph intercommunication is maintained by four 5-kilowatt Government stations situated at Jesselton, Sandakan, Kudat and Tawau respectively. The Siemens Quenched Spark system is employed throughout. The Sandakan station was the first erected in the State and completed in October, 1913. The conditions of working are, as in most tropical countries, not altogether good, owing to the strong electrical disturbances and the mountainous country which is covered with dense jungle. The four stations have, however, maintained an uninterrupted day service since their erection.



TYPICAL GERMAN THREE-ELECTRODE RECEIVING VALVE.

[*To face page* 128


1 Public correspondence with ships
2 Naval official traffic / Government traffic
3 Restricted public correspondence / Inland public correspondence / Inland stations
5 Transocean public services
12 Under construction
Equatorial Scale
500 Geog. Miles
FRENCH INDO CHINA
SIAM
SOUTH CHINA SEA
Hainan
Luzon
Manilla
PHILIPPINE ISLANDS (U.S.A.)
Mindanao
Palawan
PACIFIC OCEAN
CAROLINE IS
Guam I.
Ladrone or Marianne Is
Yap I.
Pelew Is
SUMATRA
Sabang Radio
Penang Radio
Padang
Singapore Radio
Singapore
Seletar
C. St. Jacques
BORNEO
Kuching
Pontianak
Labuan I.
Miri
Brunei
Jesselton
Kudat
Sandakan
Tawao
Tarakan
Balikpapan Radio
Celebes
Macassar
JAVA
Batavia
Weltevreden Radio
Surabaya
Siteobondo Radio
Christmas I (Br)
Cocos or Keeling Is (Br)
Amboina Radio
Moluccas
Dilli
Timor
Keopang Radio
AUSTRALIA
NEW GUINEA (Br)
Eitape
Madang
Morobe
Port Moresby Radio
Samarai
Torres Str.
Manus
Bismarck Archo
Kawieng
Rabaul
Solomon (Br) Is
Woodlark I.
Longitude East of Greenwich
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ADMINISTRATION.

Wireless telegraphy is administered in accordance with the provisions of the following ordinance :—

WIRELESS TELEGRAPHY PROCLAMATION, 1914.

British North Borneo has been included as a party in the International Radiotelegraphic Convention.

The following proclamation controls the use of wireless telegraphy :—

1. This proclamation may be cited as "The Wireless Telegraphy Proclamation, 1914," and shall come into force upon the publication thereof in the *Gazette*.

2. (i.) In this proclamation the expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Proclamation, 1901," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received ;

The expression "locally owned ship" means a ship owned wholly by the Government or by bodies corporate established under and subject to the laws of this State, and having their principal place of business within this State.

(ii.) Nothing in this proclamation shall prevent any person from making or using apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, license the establishment of any wireless telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in this State or on board any locally owned ship.

4. (i.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in this State or on board any locally owned ship except under and in accordance with a licence granted in that behalf by the Governor.

(ii.) Every such licence shall be in such form and for such periods as the Governor may determine, and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (i.) Any person establishing a wireless telegraphy station without a licence in that behalf, or installing or working any apparatus for wireless telegraphy without a licence in that behalf, shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, provided that no proceedings shall be taken against any person under the proclamation except with the previous sanction of the Governor.

(ii.) On being satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf, a magistrate may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (i.) The Governor may make and, when made, vary or cancel rules more particularly for all or any of the following matters :—

(*a*) For prescribing the form and manner in which applications for licences under the proclamation are to be made ;

(*b*) For prescribing the fees payable on the grant of any licence ;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, in the waters of this State shall be worked so as to prevent the interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in this State or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea ;

(*d*) For prohibiting, except with the special or general permission of the Superintendent of Telegraphs, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship or a British or a foreign ship, whilst such ship is in any of the harbours of this State ;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that the Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether locally owned ships or British or foreign ships, in the waters of this State, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time, either in all cases or in such cases as may be deemed desirable ;

(*f*) And generally for the more effectual carrying out of the provisions of this proclamation.

(ii.) No rules made in respect of the matters described in paragraphs (*c*), (*d*), and (*e*) of sub-section (i.) shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. On an application for a licence proving to the satisfaction of the Governor that the whole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted to such applicant, subject to such special terms, conditions, and restrictions as the Governor may think proper that such licence shall not be subject to any rent or royalty.

8. (i.) Every omission or neglect to comply with, and every act done or attempted to be done contrary to, the provisions of the proclamation, or of any rule made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued, shall be deemed to be an offence against, not otherwise specially provided for, the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine not exceeding five hundred dollars.

(ii.) All convictions, forfeitures, and fines under this proclamation, or any rules made thereunder, may be had and recovered before the Court of a Magistrate of the First Class.

BRAZIL

THE great Republic of Brazil extends on both sides of the Equator. With regard to latitude it stretches between 4° 22′ N. and 33° 45′ S., whilst with regard to longitude it lies within the limit of 34° 40′ and 73° 15′ W. It covers an area estimated at 3,298,870 square miles, and abounds in natural wealth of every description. Originally a colony of "Britain's oldest ally," the most cordial relationship between Brazilians and British is traditional with both nations.

CONTROL.

The radiotelegraphic stations of the country are exclusively under the control of the Government, and their administration is regulated by the Minister of Public Works with respect to installations of a civil character, and by the Ministers of State for War and the Navy with respect to installations destined for national defence and the services of the military and naval forces.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Dr. Pires do Rio	Minister of Public Works	Ministerio da Viacao
Dr. Antonio Nogueira Penido	Director General Telegraphs	Reparticao Geral dos Telegraphes
Dr. Francisco Bhering	Sub-Director Technical Department	Do
Dr. Raul Soares	Minister of Marine	Ministerio da Marinha
Admiral Gomes Pereira	Chief Naval Staff	Do.
Capt. Moraes Rego	Chief Naval Radio Service	Do
Dr. Pandia Calogeras	Minister of War	Ministerio da Guerra

N.B.—The Radiotelegraphic Service of the Army is directed by an officer of the 1st Battalion of Engineers.

By Decree No. 13124 of August 7th, 1918, stations under the Ministry of Public Works were transferred to the Ministry of Marine for war purposes, but it has been arranged for these stations to revert to the Ministry of Public Works.

ORGANISATION.

There are no private, experimental or amateur wireless installations; all have been abolished by order of the Government. There are no wireless societies, clubs or publications. The only company manufacturing *wireless apparatus* in Brazil is Marconi's Wireless Telegraph Company, Limited, Rio de Janeiro, which company also conducts a wireless school. The Telegraph Department have established an official School of Radiotelegraphy. This school will not be open for some time. Dr. Francisco Bhering, Sub-Director of the Telegraph Department and a professor of the Polytechnic Engineering School, has been appointed first Director. One of the salons has been given the name of Marconi, in honour of the great inventor. Another salon bears the name of Morse.

According to the latest information available, the following constitute the number of stations at present working :—

LAND STATIONS.

Commercial traffic with ships	9
Government traffic only	16
Public traffic inland	10

(There are no privately owned Land Stations.)

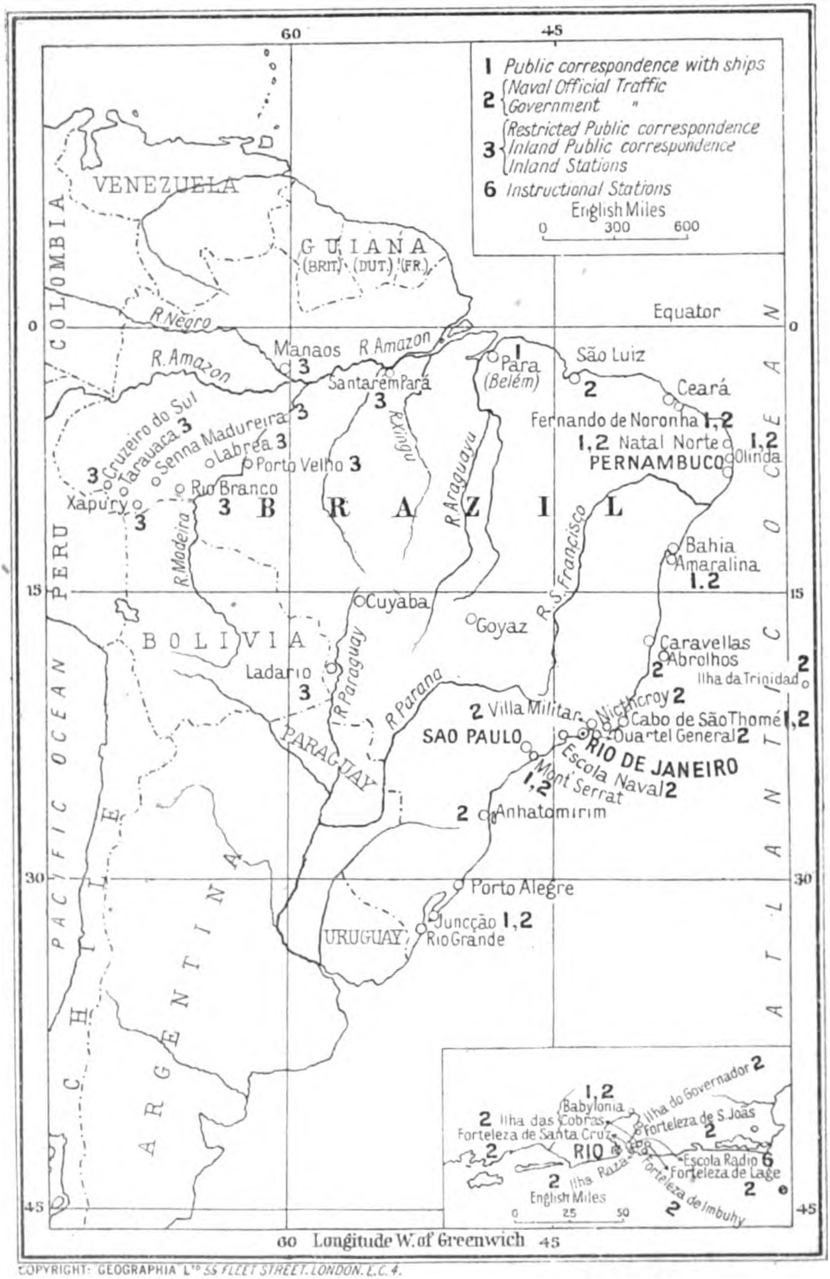
SHIP STATIONS.

Naval vessels	30
Merchant vessels	101

ADMINISTRATION.

The following laws and regulations govern the administration of wireless in the Republic :—

A—Extract from Act relating to the Brazilian Merchant Service.
B—Extract from Law No. 2,719 of December 31st, 1912.



1 Public correspondence with ships
2 Naval Official Traffic / Government "
3 Restricted Public correspondence / Inland Public correspondence / Inland Stations
6 Instructional Stations
English Miles 0 300 600
VENEZUELA
COLOMBIA
GUIANA (BRIT.) (DUT.) (FR.)
R. Negro
R. Amazon
Equator
Manaos 3
Santarem Pará 3
Para (Belém) 1
São Luiz 2
Ceará
Fernando de Noronha 1,2
1,2 Natal Norte 1,2 Olinda
PERNAMBUCO
Cruzeiro do Sul 3
Tarauaca 3
Senna Madureira 3
Labrea 3
Porto Velho 3
Rio Branco
Xapury 3
B R A Z I L
R. Xingu
R. Araguaya
R. Madeira
R. S. Francisco
PERU
Bahia
Amaralina 1.2
Cuyaba
Goyaz
BOLIVIA
Ladario 3
R. Paraguay
R. Parana
Caravellas
Abrolhos 2
Ilha da Trinidad 2
Nictheroy 2
2 Villa Militar
Cabo de São Thomé 1,2
SAO PAULO
Quartel General 2
RIO DE JANEIRO
Escola Naval 2
Mont Serrat 1,2
PARAGUAY
2 Anhatomirim
PACIFIC OCEAN
ATLANTIC OCEAN
CHILE
ARGENTINA
Porto Alegre
Juncção 1,2
URUGUAY
Rio Grande
1,2 Babylonia
2 Ilha das Cobras
Forteleza de Santa Cruz 2
Ilha do Governador 2
Forteleza de S. Joas 2
RIO
Escola Radio 6
Forteleza de Lage 2
Ilha Raza 2
Forteleza de Imbuhy 2
English Miles 0 25 50
60 Longitude W. of Greenwich 45
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C—Law 2,738 of January 4th, 1913.
D—Decree 10,689 of January 14th, 1914.
E—Regulation.
F—Form of Licence.
G—Decree No. 3,296 of July 10th, 1917.
H—Extract from Decree No. 3,316 of August 16th, 1917.
I—Project No. 367 of 1919.

It must be noted that "D.," although passed by Congress and signed by the President of the Republic, would not appear to have yet come into active operation in its entirety. It will be observed, for instance, that the Decree gives permissive power to the Government to allow Private Corporations and the Authorities of the States comprising the Republic to erect stations within certain limitations. The later Decree, lettered "G.," seems to contemplate the suspension of this power and possibly of some other provisions also.

ACT RELATING TO THE MERCHANT SERVICE.

A The following Articles refer to Wireless Telegraphy:

ART. 159.—Those boats must without exception be provided with radiotelegraphic apparatus, approved by the General Direction of Telegraphs, with the necessary power to allow of communication with the wireless stations in the zones in which they trade, when:

(a) they carry passengers and are employed in the coastal trade, of any description whatsoever, and have a registered tonnage of over 300 tons, and for those boats employed in river trade having a registered tonnage of over 500 tons.

(b) They are only employed in the coastal trade as cargo boats, but carry over 30 (thirty) souls all told.

ART. 160.—After the promulgation of this regulation, no ship shall be registered by any Port Authority if it has not complied with the regulations of the preceding Article, the licence to navigate being refused to any ship which, within one year from the date of the promulgation of this regulation, shall not have fulfilled the dispositions set forth herein.

LAW NO. 2,719.

DECEMBER 31ST, 1912.

B The above Law fixes the Coast Tax at 6 francs for a telegram up to 10 words, and 60 centimes for each extra word. Included in the rate is the transmission between a coast station and the telegraph stations to which the wireless station is directly joined up.

There is a land telegraph charge (*via* National lines) of 25 centimes a word without minimum on telegrams destined to telegraph stations which are not directly connected up with a coast station.

For telegrams exchanged between Brazilian coast stations and ships flying the Brazilian flag the ship tax has been fixed at 240 reis a word with a minimum of 10 words, the coast tax at 400 reis a word with a minimum of 10 words, and the land telegraph charge (if any) at 200 reis a word without a minimum.

LAW NO. 2,738.

JANUARY 4TH, 1913.

C A new wireless district was created by the above Law, with a credit of 732 contos, to include the Acre, Amazonas, and Para wireless stations, and these stations have since been taken over by the Telegraph Department and opened to public traffic.

DECREE NO. 10,689.

JANUARY 14TH, 1914.

D Approves the regulations governing the national wireless system.

The President of the republic of the United States of Brazil, using the authority granted to him by Section 1 of Art. 48 of the Constitution, hereby decrees:

Sole Article.—The regulations for the national wireless service revised by the combined Civil and Military Technical Committee issued together with the present decree, signed by the Ministers of State for the Affairs of Roads and Public Works and for the Affairs of the War and Marine, are hereby approved by virtue of Articles 18 and 19 of Law No. 2,050 of the 31st December, 1908.

Rio de Janeiro, 14th January, 1914, 93rd of Independence and 26th of the Republic.

HERMES R. DA FONSECA.

José Barboza Gonçalves
Alexandrino Faria de Alencar.
Vespasiano Gonçalves de Albuquerque e Silva

REGULATIONS.

FOR THE NATIONAL WIRELESS TELEGRAPHIC SERVICE REFERRED TO IN DECREE NO. 10,689 OF THIS DATE.

(Revision of 1913.)

CHAPTER I.

E *Wireless telegraphic system and organisation of the respective stations.*

WIRELESS TELEGRAPHIC SYSTEM.

ART. 1.—The wireless telegraphic system shall consist of the fixed stations erected on the coast and on the islands and in the interior of the republic depending upon the Ministries of Roads and Public Works, of Marine and War and of mobile stations existing in ships navigating under the Brazilian flag.

ART. 2.—The fixed stations shall constitute five groups, to wit:

1. International service by land or oversea.
2. Ocean service.
3. River or fluvial service.
4. Frontier or border service.
5. Inter-State service.

Sole Paragraph.—The wireless telegraphic and telephonic service over Brazilian territorial waters is under the exclusive control and supervision of the Federal Government.

ART. 3.—The mobile stations dependent upon the different departments of the administration interested in each shall constitute other groups intended for the purposes of the travelling service in general, and shall be formed according to the requirements of each department.

Sole Paragraph.—Carts, aeroplanes and airships when fitted with wireless telegraphic and telephonic stations shall constitute the object of provisional instructions issued by the Combined Technical Committee in regard to their class.

ART. 4.—The States in the establishment or authorisation of the inter-State service shall have in view the provisions set forth in the Convention of Berlin, 1906, and maintained in the London Convention, 1912, as regards the obligation assumed by the Union that it would impose the fulfilment of the international provisions upon such private enterprises as might be authorised either to establish or to operate coastal wireless telegraphic stations open to the public service between the land and the ships at sea, or authorised to establish and operate wireless telegraphic stations open or not to the public correspondence on board any ships sailing under the flag of the said nations. This provision must therefore be complied with in the three cases of the carrying out of works which are defined by law as being under administration, by contract and by concession.

ART. 5.—The Federal Government reserves for itself, in a general manner, the inter-State service, in accordance with section 4 of Article 9 of the Federal Constitutional Law, and due to the fact that all the States and the Acre Territory are provided, without exception, with Federal telegraph services with or without wires.

Sole Paragraph.—The communication between any points situated on inter-State border zones, whenever they shall not cause any losses whatsoever to the Federal Services, may be authorised by the States interested with the approval of the Union previously granted by means of temporary permission without privilege, provided the development of the national telegraph system be protected.

ART. 6.—The fixed federal stations, besides the ordinary inter-communications, must attend to the mobile stations not only on any craft navigating on the rivers and the ocean, but also to those placed on carts and others intended for the service of the Army and for public works in general.

Sole Paragraph.—Whenever the service of the fixed intra-State stations shall have to reach beyond the border of the States it shall be turned over to the Federal fixed stations specially such messages as may be intended for the fluvial correspondence.

ART. 7.—The fixed and moveable stations of the Ministries of War and Marine shall comply, as far as possible, with the same regulations governing the fixed and movable stations depending upon the Ministry of Roads and Public Works and upon the States, as also with the provisions set forth in the International Conventions and Regulations in force.

Sole Paragraph.—The naval stations and those belonging to the Army shall, nevertheless, be always obliged to comply with the provisions of Articles 8 and 9 of the London Convention dated 1912, and that of Berlin dated 1906—*i.e.*, they shall as far as possible avoid disturbing the service of the other stations of the same kind, and shall receive with absolute priority the signals of distress.

ART. 8.—It shall be the duty of the stations constituting the national system depending upon the Ministry of Roads and Public Works, the Ministry of War and the Ministry of Marine and upon the States to prefer normally the watch service having in view any disasters on the seas or the rivers and other accidents, in accordance with Art. xxi., as regards preference, and Art. xxxii. regarding the hearing during three minutes after every period of 15 minutes of transmission (International Radiotelegraphic Regulations of 1912.)

Section 1.—The stations depending upon the Ministry of Roads and Public Works and upon the States are intended for the service of public correspondence in general, between the land and the ships at sea, and the rivers, as also overland or any special services pertaining to public administration.

Section 2.—The Army and Navy stations are intended for the official correspondence, and, without prejudice to such services, for private correspondence of their crews and men (soldiers).

Section 3.—Stations intended for traffic of public messages in general must give preference to the messages from the naval stations and of the Army. Correspondence with the military stations can only be preferred by the service of distress.

ART. 9.—Naval stations although erected for strategical purposes of the defence of the country along the ocean rivers, the borders of navigable river or on board ships, and notwithstanding that the fixed stations of the Army shall be intended for the purpose of assisting in the military exercises or in the defence of the nation they may nevertheless, whenever the Government may deem it convenient, be authorised to take care of the public service in general. In such cases these stations shall during that period be entirely subject to the provisions of the regulations in force.

Sole Paragraph.—The stations on the borders, over and above the strategical use they may have, shall also serve as exchange stations for the international overland service with the bordering republics whenever it may be convenient.

ART. 10.—Out of the total number of stations of the wireless telegraph system a certain number shall be selected to take care of the general hour service in accordance with the International Convention of Paris and with the Regulations for the interior service approved by the Department of Agriculture, Industry and Commerce. (Decree No. 10,540 of the 5th November, 1913.)

Sole Paragraph.—The stations at Norenha, Rio de Janeiro, Trimdad and Juncção (in the State of Rio Grande do Sul) shall transmit message of the hour to the sea and inland as provided by the Conference of Paris, 1912.

ORGANISATION OF THE WIRELESS TELEGRAPH STATIONS.

ART. 11.—The name of fixed coastal station shall be given to all wireless telegraph stations established on firm land or on board ships permanently anchored near the coast or yet on the islands near the coast.

ART. 12.—The name of boat station shall be given to those stations of wireless telegraphy established on board a merchant ship or a man-of-war not permanently anchored.

ART. 13.—The name of fixed station simply shall be given to all and any wireless telegraph stations established on firm land and proposed to handle traffic between fixed points or between the land and ships sailing on the rivers.

Sole Paragraph.—All fixed wireless telegraph stations, coastal or otherwise, shall be connected by wires to the ordinary stations of the General

Telegraph Department or to stations of other telegraph lines, provided this connection shall be deemed useful for the service, practically possible and economically convenient.

Art. 14.—The stations in general shall be organised under the following conditions:

1. In accordance with the progress of science and technics by selecting for the purpose as far as possible the most perfect apparata;
2. By providing them with the necessary material capable of insuring a continuous service inclusively at the boat station by providing them with reserve plants (Art. XI. of the International Regulations, 1912);
3. By providing them with the necessary staff capable of insuring a continuous service, the operators to possess certificates of their professional capacity, whether they be employed at the fixed stations or at the stations on board ship (International Regulations, 1912, Art. X.; International Regulations, 1906, Art. VI., section 5).

Art. 15.—The stations shall be classified according to the energy irradiating from their antennæ, rather than according to their reach as main stations and stations of the first, second and third classes.

Section 1. Main stations are those stations irradiating 25 kilowatts or more of oscillatory energy;

Section 2.—Stations of the first class are those stations irradiating from 10 to 25 kilowatts exclusive;

Section 3.—Stations of the second class are those stations irradiating from 5 to 10 kilowatts exclusive;

Section 4.—Stations of the third class are those stations irradiating from one to five kilowatts exclusive. Stations irradiating less than one kilowatt shall be classed as third class auxiliary stations.

Art. 16.—The employment of the wave compartments shall be subject to the International Regulations (Arts. II., III., IV., XXXV., section 2) of London; nevertheless for inland service this may be governed by local convenience and traffic.

Section 1.—For the ordinary ocean service (2nd group of stations), intended for the purpose of public messages in general, two wave compartments of 300 metres and of 600 metres shall be admitted; one of these, however, shall be indicated in the International Nomenclature as being the normal law wave-length of the station.

Section 2.—In special cases the stations of the ordinary ocean service shall be allowed to employ a wave of 1,800 metres, in accordance with the provisions of *section* 2 of Art. XXXV. of the International Regulations.

Section 3.—Wave compartments below 600 metres, those of 300 metres excepted, and compartments of more than 1,600 metres will be admitted for employment for the large ocean service for messages other than public messages in general.

Section 4.—Stations intended for the sole purpose of irradiating signals to determine the position of ships shall employ waves of not more than 150 metres.

Section 5.—Every station on board ship shall be established in such a way that it will be capable of utilising, in transmitting and receiving, waves of 600 metres and of 300 metres, the former being the normal extent of the wave.

Section 6.—Every station on board ship shall be established in such a way that it will be capable of receiving calls transmitted with the normal wave.

Section 7.—Waves of less than 600 metres, those of 300 metres referred to in section 5 excepted, shall only be admitted for use by ships subject to previous authority of the Government and in special cases.

Section 8.—Ships of light tonnage materially unable to transmit with a 600 metres wave shall be admitted to utilise exclusively the 300 metres wave; they shall nevertheless maintain their plant in a condition at any time to receive messages by means of the normal 600 metres wave.

Section 9.—In the event of difficulty of communications and in order to avoid momentary interference, a regulation length of wave may be employed other than the normal length; the normal length shall, however, be resumed when the momentary difficulties to traffic shall cease.

Section 10.—Naval stations and the stations of the Army shall transmit by means of waves of such length as shall as far as possible avoid their services interfering with the service of public traffic in general. Such lengths, for instance, as 200 metres, 800 metres and 1,200 metres approximately.

General Technical Committee.

Art. 17.—The localisation, the establishment and the traffic of fixed wireless telegraph stations under the control of the Departments of Road and Public Works, of War and of Marine and of the different States shall, in every case, be considered by the Combined Technical Committee in view of their utility in regard to trade, to shipping and to the defence of the national territory, so as to conciliate in the best possible manner the interests of each.

Sole Paragraph.—In grading the power of each station the provisions of Decree No. 10,090 of February 1st, 1913, shall be observed.

Art. 18.—Whenever the civil and military authorities directly interested shall have to make scientific or technical experiments in wireless telegraphy or telephony they shall in the first place notify their intention to the Combined Technical Committee for the purpose of co-ordinating and obtaining the best possible advantage out of the combined efforts of those Departments of which the members of the Committee are the delegates.

Section 1.—With the exception of the Federal and State authorities, no other authorities or private parties shall be allowed to make experiments or to erect and equip for purposes of experiments or for tuition wireless telegraph or telephone stations unless they shall first obtain the authorisation of one of the departments of the Administration, according to each case, after hearing the Combined Technical Committee.

Section 2.—The Combined Technical Committee shall be informed by the Departments interested of the results obtained with the different types of apparatus or systems of erection employed by the different stations under operation.

Section 3.—It shall pertain to the Combined Technical Committee to consider the complaints of a technical nature relative to the working of the different stations when informed by the Federal Departments and the administrations of the different States, by Private Enterprises or by Foreign Powers.

Section 4.—In the cases where the experiments of wireless telegraphy or telephony shall pertain to the initiative of the Combined

Technical Committee by proposal made to any of the Departments of the Administration interested therein, the expense shall be for account of the Department having ordered such experiments.

ART. 19.—The Government shall take action in accordance with the laws in force with regard to ordinary telegraph matter against all those who shall operate wireless telegraph or telephone plants without permission, whether publicly or under concealment.

Sole Paragraph.—The fault to which this article refers shall in time of disturbance of the public order or of war be considered respectively as an act of resistance against the public authorities or as spying.

ART. 20.—Whenever the Government may be obliged to maintain wireless telegraph stations for the public service in general in fortified places, whether of the Army or of the Navy, the matter will be considered by the Combined Technical Committee, in order to avoid prejudice in any way to the military services.

Section 1.—The stations to which this article refers shall be in time of peace operated by civilians, and in time of disturbances of the public order or of war by military operators.

Section 2.—While on duty in fortified quarters, whether of the Navy or of the Army, the civil employees shall be under the military rule.

ART. 21.—In case of interruption to the service of the overland telegraph lines the wireless telegraph stations shall take care of the telegraph service of the section where the interruption has occurred, without prejudice, however, to the "watch" and "ocean" services.

Section 1.—The military stations of the Navy and of the Army shall also undertake to forward the ordinary telegraphic service if they are situated in the section where the interruption has occurred, and are also to do so without prejudice to the military service.

Section 2.—The stations established along the rivers Parana, Uruguay and São Francisco shall, when necessary, serve as exchange stations between the borders and the coast.

Section 3.—For the better co-ordination of the services the Combined Technical Committee shall keep up to date the plan of the whole system referred to in Decree No. 10,090 of February 1st, 1913, so as to be able to be supplied to the interested authorities, whether federal or of the States.

GENERAL TELEGRAPH DEPARTMENT.

ART. 22.—The establishment and operation of the wireless telegraph and telephone stations intended for the service of the public in general and other services depending upon the Department of Roads and Public Works shall be pertinent to the General Telegraph Department.

Section 1.—The same department shall also centre in its hands all matters concerning the collection of taxes and administrative connections with foreign wireless telegraph services and with the International Office at Berne.

Section 2.—It shall see that the International Regulations for the transmission of commercial messages from the stations on board merchant ships are properly observed.

Section 3.—It shall exercise the supervision of private enterprises operating in wireless telegraphy and telephony.

Section 4.—It shall have the power to train wireless telegraph operators in accordance with the regulations in force by administering to them theoretical and specially practical tuition (Articles 271, 367 and 337 of the Regulations of 1911 in force) and awarding them the certificates referred to in the International Regulations (Art. X. of 1912) and in the present Regulations (Art. 14, section 3).

Section 5.—Certificates of wireless telegraph operators awarded by the Institutions of Higher Studies and by the private professional schools shall be acknowledged by the Government after the approval of the Combined Technical Committee.

Section 6.—For the purposes of the experiments referred to in sub-section *d* of Art. 19 of Law No. 2,050 of the 31st December, 1908, and which may interest the Department of Roads and Public Works, a credit shall be reserved out of the appropriation for "wireless telegraph services."

ART. 23.—In military wireless telegraphy the same procedure shall be adopted as for civil wireless telegraphy in so far as the tuition of the wireless telegraph operators is concerned, so that the programmes being formed on a common basis the certificates may also be considered as equivalent.

ART. 24.—Bearers of certificates of qualification awarded by the schools referred to in Arts. 22 and 23 alone shall be admitted to take charge or to serve as employees of the wireless telegraph stations, whether fixed or movable, civil or military, belonging to or authorised by the Government.

Section 1.—The provisions contained in Art. X. of the International Regulations of 1912, extended by the provisions of Art. VI. of the International Regulations of 1906 relative to the professional qualification of wireless telegraph operators shall be strictly observed.

Section 2.—The programmes and the course of proceedings at the schools shall be subject to the approval and supervision of the Combined Technical Committee in order to ensure the compliance with the provisions of the present regulations concerning the matter.

ART. 25.—Authorisations, permissions and licences for the establishment and operation of wireless telegraph and telephone services whether in the territory of the Union or of the different States shall be subject to the provisions in force relative to the ordinary telegraphic services. The new services are already placed on a like footing with the ordinary service, under the International provisions already approved by Congress, and by a decree of the executive power dated November 27th, 1911, issued under No. 9,148 as per sole paragraph of Art. 2 thereof.

ART. 26.—Telegraph stations erected on board merchant ships and ships of the coastal trade as referred to in Art. 173 of the Regulations approved by Decree No. 10,524 of October 23rd, 1913, shall be subject to the international provisions contained in Arts. IX. and XI. of the Regulations of London.

Section 1.—Licences for the establishment of the stations shall be applied for before the Department of Roads and Public Works to which it shall pertain to exercise the supervision referred to in Arts. IX., X., XI. and XII. of the Regulations of London.

Section 2.—The supervision of the stations erected on board ships as referred to in the last preceding article shall be under the care of the General Telegraph Department, to which the Department of Roads and Public Works shall give notice of the licences given.

Section 3.—Licences shall be given under the form hereunto appended.

Section 4.—The initials or indexes of calls from the stations on board national ships possessing the necessary licences shall be given by the General Telegraph Department in accordance with the provisions of the International Regulations in force (Section 2 of Art. V.), and in accordance with the notices issued by the International Office at Berne.

Section 5.—With regard to infringements and penalties occurring in view of the licences given to ships and certificates of operators, the provisions of Arts. IX. and XII. of the Regulations of London shall be strictly enforced.

ART. 27.—The stations on board merchant ships or men-of-war shall be classed by the Government in three different classes which shall be expressed on the licences in the case of merchant ships, viz.:—

1. Stations with permanent service (N).
2. Stations with a limitation of service.
3. Stations not charged with special obligations (X).

The stations of the first class shall maintain continuous watch. The stations of the second class shall be permanently attent during the time of service, and out of this time of service during the first ten minutes of each hour. The stations of the third class shall not be subject to a regular service of attention (Art. XII., section 3, of the Regulations of London).

ART. 28.—Stations on board national ships must, and stations on board foreign ships may, communicate free of charge once a day to the fixed stations the meteorological bulletins for the Directorate of the Meteorological Service.

Section 1.—The ships shall also receive communication of the bulletins of the Meteorological Service that might interest navigation.

Section 2.—If the ships request the Meteorological Service to transmit to them meteorological information, the communications shall be made by means of taxed service advices, and the taxes shall be charged to the account of the ships to which such messages were transmitted.

Section 3.—Communication regarding the weather involving information relative to precautions to be taken against danger shall be transmitted free of charge and urgent.

ART. 29.—All wireless telegraph stations without exception, whether fixed or movable, shall keep a book of entries in which, besides the messages exchanged, note shall be taken of the commencement and winding up of the services when the case is not of a permanent service, of accidents that may have occurred, of difficulties of communication, damages to the apparatus, etc.; in short, of all details of the service.

Sole Paragraph.—The said stations shall also possess schematic charts of the ocean or of the rivers for the purpose of registering the position of the movable stations.

ART. 30.—The provisions of the international regulations concerning wireless telegraphy and of the Regulations of the General Telegraph Department shall apply respectively to foreign and home relations. In the home service the provisions of the present regulations for wireless telegraphy shall prevail over such provisions of the regulations of the General Telegraph Department as may be contrary thereto.

Sole Paragraph.—The provisions contained in military regulations and interesting wireless telegraph service in general shall be communicated to the General Telegraph Department by the Combined Technical Committee.

CHAPTER II.

Manner of Wording and Depositing Wireless Messages.

ART. 31.—Wireless telegraph messages shall contain as first word of the preamble the indication of the service "radio" (see Arts. XIV. and XV. of the Regulations of London).

Section 1.—The text of wireless messages may be in any one of the languages admitted by the International Telegraph Regulations for the time being in force (Revision of Lisbon, Art. 8, section 2).

Section 2.—Wireless messages made up by means of the International Code of Signals, designed under the index P R B, shall be transmitted to their destination untranslated.

Section 3.—Cases of doubt in the matter of traffic shall be considered and decided by the General Telegraph Department.

CHAPTER III.

Transmission of Wireless Messages, Calls, General Provisions for Traffic.

Consult International Telegraph Regulations of 1908, Art. LXII., Chapter 12, corresponding to Art. 9 of the Convention of St. Petersburg. Consult also Chapter 6 of the International Wireless Telegraph Regulations, 1912.

TRANSMISSION.

ART. 32.—For the transmission on wireless messages, the signals used shall be those of the International Morse Code.

Sole Paragraph.—Telegraphic sign shall be transmitted in accordance with the provisions and rules established by the regulations in force issued by the General Telegraph Department. (Consult Regulations of Lisbon, Chapter 10, Art. XXII.)

ART. 33.—Ships in distress shall employ the signal S O S, which shall be repeated at fixed intervals accompanied by the necessary information.

Upon noticing the signal of distress any and every station shall immediately interrupt the correspondence in hand, which shall not be resumed until the station shall have ascertained that the communication by the call for assistance is concluded.

Section 1.—Stations noticing a call for assistance shall observe the indication supplied by the ship making the call, not only in the order of communications but also in the termination thereof.

Section 2.—Whenever a series of calls for assistance shall be accompanied by the indexes of call from a certain station, this latter station alone shall be expected to attend, unless, however, the said station shall not reply.

In the absence of indication of a certain station, any station noticing the call for assistance shall be under the obligation to reply.

Section 3.—Wireless telegraph messages from or relative to ships in distress shall have preference above all others.

ART. 34.—In giving or requisitioning explanations in regard to wireless telegraph services, the different stations shall make use of the signals contained in the list appended to the present regulations and to the International Regulations, 1912.

ART. 35.—In transmitting wireless telegraphic messages all the special indexes con-

tained in the International Telegraph Regulations, revised in Lisbon, shall not be admitted; only those indexes contained in the International Wireless Telegraph Regulations of London, Art. XXXVIII., shall be admitted.

Section 1.—With regard to wireless telegraphic messages for transmission by express, when the expenses shall have been collected from the receiver, the General Telegraph Department shall establish special instructions which shall be notified to the International Office.

Section 2.—It will be permitted to make special indication relative to the number of days during which wireless telegraphic messages shall have to remain in deposit at a coastal station awaiting the passage of the ship for which they are intended.

Art. 36.—As between any two stations wireless telegraphic messages of the same class shall be transmitted separately and alternately or by series of various messages according to the indication of the coastal station, on condition that the time for transmission of each series shall not be more than 15 minutes.

Section 1.—Before commencing to exchange correspondence the coastal station shall advise the station on board ship whether the transmission will be made alternatively or by series. Then the coastal station shall commence transmitting or notify its readiness to receive.

Section 2.—The transmission of each wireless telegraphic message shall be preceded by the signal ▬ ● ▬ ● ▬ and terminated by the signal ● ▬ ● ▬ ● followed by the index of the sending station and of the signal ▬ ● ▬ ● In the case of a series of messages, the index of the sending station and the signal ▬ ● ▬ shall only be given at the end of the series.

Section 3.—Wireless telegraph messages shall be transmitted in the following order :—

(*a*) Messages of the State.

(*b*) Messages of the Service.

(*c*) Private urgent messages, but only in respect of their course over the overland lines.

(*d*) Ordinary private messages.

(Compare Regulations of Lisbon, Art. XXXII.)

Calls.

Art. 37.—The control of the service on the stations on board ships lying within the maximum reach of any coastal station shall be exercised by the latter.

Section 1.—Stations on board ship and also limited coastal stations shall conform with the instructions received from the permanent station.

Section 2.—The permanent coastal station shall attend and cause attention to be given to ships on the point of leaving the zone of their common reach, having in view the position, direction and speed of the said ships.

Section 3.—The permanent coastal station shall have authority to transmit orders for silence; the station on board ship shall thereupon cease transmitting ordinary messages until it shall be allowed to continue.

Section 4.—Besides in the case of traffic conveniences, silence may be imposed in view of the provisions of Art. 45 of the Regulations of London (hour service).

Section 5.—Any station proposing to transmit with high power shall first issue three times the sign of attention, M I M (▬ ▬ ● ● ▬ ▬), using the lowest power necessary to reach the neighbouring stations. It shall not commence transmitting with high power before 30 seconds after having issued the sign of attention.

Section 6.—Whenever any one coastal station shall receive calls from several stations on board ships at one time it shall decide as to the order in which those stations shall be admitted to transmit.

In taking this decision the coastal stations shall have in view simply the necessity of permitting any one station interested to exchange the greatest possible number of wireless messages.

Section 7.—In the event of any one station failing to attend to the calls issued three times with an interval of 2 minutes, the said calls shall not be renewed before a further interval of 15 minutes, and even so when the station having made the call shall be certain that there is no other wireless telegraphic communication under way.

Art. 38.—In general it is the station on board ship that calls up the coastal station, whether there be wireless messages for transmission or not.

Section 1.—The station on board ship shall not call up the coastal station, chiefly in the zones of a heavy traffic, before it comes within a distance of 3/4 of the normal reach of the latter.

Section 2.—Before proceeding to make calls, the coastal station or the station on board ship shall regulate to the highest sensitive point possible their receiver system, and ascertain that no other correspondence is being held within the zone of reach; when they shall proceed otherwise, upon remarking any disturbances of correspondence the coastal station or the station on board ship shall immediately cease calling, unless they shall find that the calls are not apt to disturb the communications under way.

Section 3.—On the other hand, the coastal stations or the stations on board ship when answering calls made upon them shall take the same precautions.

Section 4.—If notwithstanding these precautions the transmission of any wireless telegraphic message shall be interfered with, the call should cease for the traffic of public correspondence. This station, in making the request, shall indicate the approximate duration of the delay.

Section 5.—The station on board ship shall inform the coastal station to which it shall have signalled its presence the moment at which it shall have to interrupt communications and the time during which this interruption shall last.

Section 6.—The station on board ship shall only be allowed to make calls upon the next coastal station in cases where, owing to difficulties of traffic, it shall not have been possible to establish correspondence with the preceding station, out of whose reach it has just come.

Section 7.—In making calls the stations shall employ the normal wave of the station on which they shall have to call.

Section 8.—All stations shall seek to transmit by using the lowest possible intensity.

Art. 39.—The call shall be composed of the signal K A . . . . (▬ ● ▬ ● ▬) of the index of the station upon which the call is made, issued three times, that of the preposition "from" (de) followed by the index of the transmitting station, repeated three times.

Section 1.—The station called upon shall reply by transmitting the signal ▬ ● ▬ ● ▬ followed by the index of the corresponding station repeated three times; of the proposition "from" (de) and of the signal K (▬ ● ▬) (Invitation to transmit).

Section 2.—Stations wishing to entertain correspondence with ships, but not knowing the names of such as may be within their reach, shall employ the signal of investigation (— • — • — — • —).

Section 3.—The provisions of the present article and of section 1 shall also apply for transmission of the signal of investigation and the reply to the said signal.

GENERAL PROVISIONS.

ART. 40.—Transmissions exchanged between stations on board ship shall be effected in such a way that they shall not interfere with the services of the coastal stations, and the latter shall have the right of priority for public correspondence.

ART. 41.—As soon as the coastal station shall have answered the call, the station on board ship shall supply the details hereunder stated in the event of there being messages for transmission; these details shall likewise be supplied on demand by the coastal station:

(a) Approximate distance in nautical miles from the ship to the coastal station;

(b) The position of the ship, indicated in a concise form adequate to the circumstances of each case;

(c) The name of the next port of call of the ship;

(d) The number of wireless messages if of normal length (20 words) and the number of words in case of exceptionally long messages;

(e) The speed of the ship expressed in nautical miles when the coastal station shall require this information expressly.

Section 1.—On answering the coastal station shall inform the number of wireless messages or the number of words to be transmitted to the station on board, as the case may be; it shall also indicate the order in which the transmission shall be effected.

Section 2.—In case the transmission cannot be effected immediately, the coastal station shall inform the station on board of the probable time it shall have to wait, and in case this delay shall be more than ten minutes shall also give the reasons therefor. The station on board ship shall await the invitation to transmit K (— • —).

Section 3.—In the event of a station on board ship being called up and being unable to receive momentarily, it shall advise the station from which the call is made of the approximate time it shall have to wait.

Section 4.—In the case of exchange of correspondence between two stations on board ships, it shall pertain to the station on which the call is made to determine the order of transmission.

ART. 42.—Whenever a wireless message shall contain more than 40 words, the sending station shall interrupt transmission by means of the signal U D (interrogation) (• • — — • •) after each series of 20 words more or less, and shall not continue transmitting until it shall have received from the receiving station the repetition of the last word properly understood followed by the signal above referred to, or, if the reception was satisfactory, then followed by the signal — • —

Sole Paragraph.—In case of transmission by series, the notice of reception shall be given after each message.

ART. 43.—When the signals become doubtful it will be well to exert the best efforts to conclude transmission.

For this purpose the message shall be transmitted three times at the most, on demand of the receiving station.

Section 1.—If notwithstanding this treble transmission the signs shall still be unintelligible, the message shall be cancelled.

Section 2.—If the receipt advice is not received, the transmitting station shall make a fresh call on the receiving station. If no answer is made after the third call the transmission shall not proceed.

In this case the sending station shall have the faculty to obtain the receipt advice through another wireless telegraph station by utilising in case of necessity the overland lines.

ART. 44.—When the receiving station shall be of opinion that, notwithstanding a defective reception, the message can be delivered, it shall insert at the end of the preamble the service remark "reception doubtful," and shall forward the message.

Sole Paragraph.—In the event of the telegraph lines being utilised the General Telegraph Department shall recover the taxes in accordance with the provisions of Art. XLII. of the Regulations of London. But if the station on board shall subsequently transmit the message to another coastal station, the G.T.D. shall recover taxes relative to one sole transmission.

ART. 45.—Receipt notices shall be given in the manner determined by the index of the sending station and followed by the index of the receiving station.

Section 1.—The end of the service between any two stations shall be indicated by both by means of the signal • • • — • — followed by their indexes respectively.

Section 2.—Ships not possessing indexes shall substitute the sign by their own name in full.

ART. 46.—Coastal stations whose service shall not be of a permanent nature shall not be permitted to wind up their service until they shall have transmitted their messages to the ships within their reach, not until they shall have received from the ships all the messages announced.

Sole Paragraph.—These provisions shall also apply in cases where ships shall notify their presence before the work of station is definitely ended.

ART. 47.—In transmitting messages from a station on board ship to a coastal station the date and hour of presentation at the station on board shall be included in the preamble.

Sole Paragraph.—In cases of re-transmission the coastal station shall cause to appear as of the station of origin the name of the ship from which the message was originally sent, and also, if possible, the name of the ship having served as intermediary, if any.

ART. 48.—In transmitting, receiving, verifying the words, repetitions and doubtful cases, the proceedings shall be in accordance with the provisions and rules in force for ordinary traffic as contained in the Regulations of the General Telegraph Department, 1911, and in the International Telegraph Regulations (1908).

ART. 49.—The sender shall have the right to indicate the number of days, but not more than 30 days, during which the telegram shall remain in deposit for transmission at the first opportunity to its destination.

Section 1.—The indication "radio in deposit" shall be reckoned as one word.

Section 2.—After the delay indicated shall have expired, or when the coastal station shall have acquired a certainty that the ship is

already beyond the reach of the next coastal station, it shall advise the sender of the fact.

ART. 50.—In the national service, as well as in the international service, the provisions of Art. VI. of the Wireless Telegraph Regulations of London as hereunder shall strictly apply—viz.:—

(1) Exchange of superfluous signals or words shall not be allowed.

(2) Tests and exercises shall only be admitted when not interfering with the service of other stations.

(3) Tests to be effected with wave-lengths other than those admitted for public correspondence and with the lowest possible energy.

ART. 51.—The dangerous parts of the apparata in the different stations shall be determined by means of plainly visible marks, and if necessary they shall even be covered up in order to avoid contact with the operators or visitors.

ART. 52.—The address of wireless messages for transmission to shipping shall be as complete as possible. They shall contain obligatorily the following:

(*a*) Name and qualification of the addressee, with full information, if any;

(*b*) Name of the ship exactly as contained in the first column of the nomenclature;

(*c*) Name of the coastal station exactly as contained in the nomenclature.

Section 1.—The name of the ship may be substituted by an indication of the route followed by the ship and determined by stating the port of origin or of destination or any other equivalent reference, at the risks and for account of the sender.

Section 2.—The name of the ship exactly as contained in the first column of the nomenclature shall in every case, and notwithstanding its length, be reckoned as one sole word when contained in the address.

Section 3.—The sender shall indicate the name of the coastal station through which the message is to be transmitted to the ship.

ART. 53.—Transmission to the stations on board ship as a rule shall only be effected when the ships on passing by call on the coastal station within their reach.

Sole Paragraph.—In wireless messages transmitted from on board ship the name of the coastal station shall appear in the preamble beside the name of the ship from which it was originally sent and followed by the name of the intermediary ship, if any; also the date and hour of presentation to the station on board ship.

ART. 54.—As a rule the stations on board should transmit their messages to the nearest coastal station.

Section 1.—The sender on board ship shall have the option of choosing the coastal station through which he desires his message to be forwarded. In this case the ship's station shall wait until the station selected shall be the nearest coastal station.

Section 2.—On the borders of the neighbouring Republics the transmission referred to in the last preceding paragraph may be made by a coastal station situated farther off. For this purpose it shall become necessary for such coastal station to be situated in the country of destination of the message and for the ship from which the message was sent to sail under the flag of the same country. (Art. XXXV., section 2, of the International Regulations of London.)

Section 3.—In cases where the stations on board ship shall be in a position to choose between different coastal stations situated at approximately equal distances, then they shall give preference to the coastal station established in the country of destination of the message or serving for the normal transit of wireless messages sent thereinto.

CHAPTER V.*

* There would appear to be some clerical error here, either on the part of the draftsman of the Law or the translator. The Law, however, as it stands in our text is complete; the error resides in the consecutive numbering of the chapters.—EDITOR.

ART. 55.—The tax of one wireless telegraphic message shall consist of the following, as the case may be:

1. The coastal tax, due to the coastal station.
2. The ship's tax, due to the ship's station.
3. The tax due for transmission over the telegraphic lines, reckoned according to the common practice.
4. The transit taxes of the coastal stations or of the intermediary ships and the taxes relative to the special services demanded by the sender.

ART. 56.—The entire amount of the tax shall be recovered from the sender with the exception of the following:

1. The express rates (Art. LVIII., section 1, of the Telegraph Regulations, revised in Lisbon)
2. The amount of the taxes applicable on such reunions or alterations of words, not allowed, as may be detected by the station of destination (Art. XIX., section 9, of the Telegraph Regulations).

These taxes shall be recovered from the receiver or addressee.

Sole Paragraph.—Stations on board ship should possess the necessary tariffs enabling them to supply these provisions, and they shall receive them in due course from the General Telegraph Department. They shall, however, have the faculty to consult the coastal stations with regard to the taxation of wireless messages, in case they do not themselves possess the necessary information for the purpose.

ART. 57.—The General Telegraph Department shall organise instructions relative to the taxation of the wireless messages, and shall in so doing consider carefully the various cases of the traffic. These instructions shall be distributed among the parties interested in the matter.

Sole Paragraph.—The said department shall further organise instructions for the keeping of proper accounts in order to facilitate and simplify the extraction of the different accounts.

CHAPTER VI.

ACCOUNTS.

ART 58.—Coastal and ship's taxes shall not be considered in the accounts provided for under the International Telegraph Regulations. Accounts relative to these taxes shall be settled by the administration of each one of the countries interested.

Section 1.—If the coastal stations shall be independent upon the Department of Roads and Public Works, the accounts shall be made up by the General Telegraph Department and communicated by the said department to the interested parties, whether public administrations or private parties.

Section 2.—In cases where the coastal station shall be under the control of the private enterprises, the holder thereof shall have the right to arrange his accounts directly with the interested parties (Art. XLI., section 1, of the

Radiotelegraphic Convention of London) without the interference of the General Telegraph Department.

Art. 59.—It shall pertain to the General Telegraph Department to make arrangements with private enterprises operating wireless telegraph plants in the country whether by means of fixed or movable stations, for the establishment of mutual traffic and for the eventual settlement of accounts in accordance with the provisions of Art. XLII. and paragraphs of the Regulations of London.

Art. 60.—It shall pertain to the Department of Roads and Public Works to make special arrangements with the neighbouring republics whether directly with their respective Governments or with private parties established and operating therein, for the purpose of establishing mutual traffic and adopting the provisions relative to keeping of accounts (Regulations of London, Art. XLII., section 4.)

CHAPTER VII.

Qualifications of Wireless Operators.

(Compare Art. 10 of the Regulations of London, 1912, and Art. 6, section 3, of the Regulations of Berlin, 1906.)

Art. 61.—Certificates of qualification of operators intending to work at the fixed and movable wireless telegraph stations which shall be issued by the official schools or by private schools acknowledged by the Government in accordance with the present regulations shall attest the professional standing of the operators with regard to:

(*a*) Transmission and reception by the ear of messages drawn up in plain language with the Morse International alphabet at the rate of 20 words per minute at least—each group of five letters counting as one word.

(*b*) Regulation of the apparatus and acquaintance with their work. This preparation should embrace the study of the most common systems, chiefly of those systems employed in the Brazilian system of wireless telegraphy.

(*c*) Acquaintance with the provisions of the Conventions and Regulations and of the rules applicable to the exchange of wireless and ordinary telegraphic communications.

Art. 62.—In passing their examinations the candidates for certificates shall:

(*a*) Operate ordinary transmission with the Morse during five minutes consecutively, at a minimum rate of 20 words per minute, each group of five letters counting as one word.

(*b*) Receive and hear legibly, at the same rate mentioned above, with the aid of a double 'phone receiver mounted to the head in the ordinary manner for reception in wireless telegraphy.

(*c*) Understand the simple diagrams of the electrical connections of the apparatus used in the system adopted for the examination.

(*d*) Enumerate the principal parts of the apparatus stating the use thereof, in such a way as to demonstrate that they would be capable of mounting the apparatus with the assistance of the diagrams.

(*e*) Mention the accidents occurring more frequently, and the means usually employed to repair them.

(*f*) Explain what is to be done in order to pass from one wave-length to another in transmitting or in receiving.

(*g*) Effect (1) regulations and adjustments; (2) alteration of wave-lengths; (3) reduction and increase of transmission energy; (4) investigation of accidents and remedies therefor.

Art. 63.—There shall be two classes of certificates: first and second class. The sole difference between these two classes of certificates shall be in respect of speed of transmission and of reception; first-class certificates shall correspond to a rate of 20 words, at least, per minute; those of the second class shall correspond to a speed ranging between 12 and 19 words per minute.

Art. 64.—In the wireless telegraph stations on board ship due regard will be paid to the provisions of Art. X. of the International Regulations of London relating to the utilisation of operators holding certificates of the first and second classes.

Sole Paragraph.—In the fixed stations service shall be assumed at least by two operators holding certificates of the first class; holders of certificates of the second class shall be admitted as assistants. Only in cases of urgency may transmissions be effected by non-certificated operators.

Art. 65.—With a view to the preparation of wireless telegraph operators the Government shall have the power, subject always to the provisions of the Organic Law of Tuition, to grant subventions to private schools in order to facilitate the preparation of these operators in the capital of the republic and in the different States.

Sole Paragraph.—For the official schools whether civil or military, the Governmen shall have the power to contract, either in tht country or abroad, qualified persons for the purpose of administering practical tuitione

Art. 66.—The certificates shall testify. to the professional standing of the wireless telegraph operators in accordance with the provisions of Arts. 61, 62 and 63, and shall contain a statement to the effect that the holder thereof shall keep the secrecy of correspondence in accordance with the national and international prescriptions.

Art. 67.—Certificates awarded by private schools must be registered at the Department of Roads and Public Works, where they will be attested by the Government in accordance with the requirements of the present Regulations and of the International Regulations, Art. 10.

Rio de Janeiro, January 14th, 1914.

FORM OF LICENCE.

(Coat of Arms).

Republic of the United States of Brazil—Department of Roads and Public Works.

F Licence for the establishment and op ration of wireless telegraph stations on board ships in accordance with Arts. 9 and 13 of the International Regulations of London, and with Art. 173 of Decree No. 10,524 of October 23rd, 1913, referring to merchant and coast trade navy.

Licence is given by the Department of Roads and Public Works to................

....

during the period of two years as from the present date, to—

I.—Establish and operate on board the steamship........... one wireless telegraph station of the system known as...........subject to the following conditions: (1) the station to be established shall comply with the

specifications hereunto appended; (2) the apparata shall be syntonized; (3) the apparata shall be capable of supporting traffic by means of waves of 300 and of 600 metres and other lengths not greater than 600 metres, the use of which may be authorised by the Government; (4) the speed of transmission and of reception of wireless messages under normal circumstances shall not be lower than 12 words per minute, counting five letters to the word.

II.—Transmit and receive wireless messages by means of the station licensed for establishment on the said ship and of the stations established on board other ships and of the fixed stations; all in accordance with the regulations in force.

The present licence is granted subject to the followng conditions:

1. The licensed station shall be operated solely by the licencee or by another person duly authorised by law.

2. The operators shall not interfere with the signals from the stations of the Army and of the Navy; they shall observe the Conventions and Regulations in force, and they shall further transmit wireless messages, on a footing of equal treatment, without favours or preferences.

3. The operators shall whenever possible receive from ships and lighthouses all calls for assistance and signals of distress, and shall answer such signals and forward them with the least possible delay to the proper authorities, either by means of his own station or through other stations or yet by another means.

4. The station shall only be operated by a holder of a certificate awarded by the Government as provided for in the National Wireless Telegraph Regulations in force.

5. The licencee and his operators shall keep complete secrecy of the wireless telegraphic correspondence in general, whether transmitted to his station or received for transmission to others.

6. Licencee shall keep proper accounts of the traffic of his station and keep on file all the messages transmitted and received by the said station, each message to bear a number of identity, the date and note of origin and destination. He shall keep all the messages received and transmitted for the period of time stipulated in the International Regulations. The archives may be inspected by the General Telegraph Department whenever it may be deemed convenient.

7. The licencee shall make arrangements by entering into a contract with the General Telegraph Department with regard to the accounts of traffic between the coastal stations and the stations licensed hereby.

8. The General Telegraph Department through one of its delegates may, at any time, inspect the station licensed hereby, and examine the apparata and the station in general and in every detail.

9. Licencee shall keep at the station licensed hereby the present licence or a certified copy of same; also all printed matter necessary for the traffic in accordance with the Convention and Regulations in force.

10. This department of the Administration shall have the power to interrupt the present licence in case of non-observance or failure on the part of licencee to comply with the clauses hereinabove stipulated.

The station authorised by the present licence shall be employed in the service of .... in accordance with section 3 of Art. 13 of the International Regulations of London, 1912.

Directorate General of Post, Telegraphs and Light ....

...............*Director General.*

.........*Director of the Division.*

ATTEST.

.........*Director General of Telegraphs.*

WIRELESS LAW NO. 3,296.

JULY 10TH, 1917.

The National Congress resolves:—

ART. 1.—The service of radio telegraphs (telegraphs without wires) in the territories and territorial waters of Brazil is exclusively within the sphere of federal Government.

Sole Paragraph.—The service of radiotelegraphy comprises also radiotelephony (telephones without wires).

ART. 2.—The establishment and exploitation of radiotelegraph stations are within the sphere of the Ministry of Public Works, in respect to its application of a civil character and the Ministries of War and Marine in reference to its applications destined to national defence and to the service of the Army and Navy.

Sole Paragraph.—The three above mentioned Ministries will enter into an agreement in respect to the localities in which must be established the stations necessary for commerce, for navigation and for the defence of the national territory.

ART. 3.—The Government may give permission to third parties, nationals, without monopoly whatsoever, to install or work one or more high-power stations in suitable places on the littoral; under the terms of the International Regulations concerning wireless telegraphy and also the Brazilian regulations which are in force for the execution of the same service; for the exclusive purpose of establishing inter-oceanic and inter-territorial communications with corresponding stations in other countries.

Par. 1.—These stations must be linked with the National Telegraphs, by whose intermediary shall be collected and distributed the international radiotelegraphic service to and from Brazil in such a manner that the Government shall receive the terminal rate in force.

Par. 2.—The rights that are conferred and the disposals contained in this article may only be used by the Government after the conclusions adopted in respect to this subject by the International Pan-American Convention, which at the recent conference in Buenos Aires was arranged should be held at Washington in 1917.

ART. 4—The States within the area of their territories which are not yet served by telegraphs with or without wires, and may wish to establish radiotelegraphic stations, shall interest the Department of Telegraphs to install and work them, debiting the respective costs against such States, and for the purposes of the adjustment of the accounts shall be considered as mutual traffic administrations with the Department.

ART. 5.—The National shipping companies whose steamers have accommodation for more than 50 passengers and whose voyages are longer than 150 miles from the port of origin of its ships and the site of the registered office of the company must install on board of such steamers a radiotelegraphic station with a

minimum range of 100 nautical miles, which shall be worked by an operator who holds a certificate of fitness granted by competent authority. The installations on board shall be provided with emergency apparatus and battery which will permit a continuation of the service in case of the failure of supply of electrical energy by the generators that depend on the main installation.

ART. 6.—Foreign ships will be permitted within or without the territorial waters of Brazil to use the radiotelegraphic stations which they have mounted on board to correspond with the coastal stations erected by the Department of Ways and Public Works previously being authorised by the same Ministry or the Department to this end and subject to the prescriptions and regulations governing this service.

Paragraph.—Foreign warships will be licensed by the authority designated by the Minister for Marine.

ART. 7.—The establishment and working of the coastal radiotelegraphic stations and others of a civil character in the interior of the country will be entrusted to the Department of Telegraphs, to which also will fall the duty of the superintendence and carrying out of all the service of fiscalisation in relation to the employment of this kind of telegraph system by the State by national shipping companies whether by fixed or moving stations and the execution of administrative acts, the promulgation of the dates of openings, the range and the class of each station and the inauguration of proceedings relative to misdemeanours committed against this branch of the service.

Sole Paragraph.—The said Department shall create a special section to which shall be entrusted the management of the service, and also it shall form a school of radiotelegraphy and it shall have authority to contract within or without the country with a professional teacher to take charge of the said school. The only persons qualified or admissable for the personnel of the said radiotelegraphic stations shall be nationals, holders of a certificate of competency issued by the above school, or by other holders of diplomas, admitted to work in the country.

ART. 8.—All the radiotelegraphic stations that were established in Brazilian territory and on board of national ships and on board of foreign ships whilst they remain or navigate on the rivers or territorial waters of Brazil, and claim to establish communication with the national stations for this purpose authorised, must be subject to the rules and regulations of the interior and international services that may be in force.

ART. 9.—Radiotelegraphic correspondence is authorised between national mercantile ships and also between them and foreign ships that possess radiotelegraphic stations aboard as well as between the said ships and the Brazilian coast stations dependent upon the Ministry of Public Works.

ART. 10—Whatever concession to persons for the establishment of a radiotelegraphic service or whatever authorisation given to use the respective apparatus installed on board foreign ships may be revoked if they do not comply with the rules and regulations or if the Ministries of Marine and War judge it necessary for the security of the country or its defence.

ART. 11.—When the civil or military Federal authorities dependants of the Ministries referred to in Art. 2 have to make scientific or technical experiments in radiotelegraphy they must give notice to the Ministries to which they depend, and when they make experiments on behalf of functionaries of other Ministries, then they must give notice to the Ministry of Ways and Works.

ART. 12.—No other besides the Federal authorities may make experiments or establish experimental radiotelegraphic stations without previous permission of the Ministry of Ways and Public Works, who can give the same with the restrictions and cautions necessary for the security and interests of the State and the efficiency of the traffic of the official stations.

ART. 13.—All the rules and regulations of the Department-General of Telegraphs shall apply to the service of radiotelegraphy with reference to the secrecy to telegrams and as to damages caused to the stations or their material.

ART. 14.—The Government will proceed in the terms of the legislation in force against those who, without permission, exploit, whether publicly or clandestinely, a radiotelegraphic service, and in time of the disturbance of public order or external war these offences shall be classified and punished in the first case as an act of resistance to constituted authority and in the last case as an act of spying.

ART. 15.—Those coastal and interior radiotelegraphic stations which are dependencies of the Ministry of Ways and Public Works, and not reserved for special purposes, will be open for public correspondence.

Sole Paragraph.—No responsibility will be accepted by the radiotelegraphic service for errors of the service or faulty delivery of telegrams, in the terms of Art. 41 of the regulations revised in London.

ART. 16.—Any Brazilian radiotelegraphic station, whether civil or military, terrestrial or marine, will be obliged to give preferential attention to calls for succour that are received by them.

ART. 17.—In all radiotelegraphic stations the public service shall have preference to private service, save in cases of *force majeure* (accidents and calls for succour).

ART. 18.—Whatever be the object for which radiotelegraphy be established the respective services shall be organised in a form not to cause disturbance to other radiotelegraphic stations, and the respective Ministries shall in all cases adopt provisions and rules necessary to such end.

ART. 19.—Radiotelegrams proceeding from a ship which flies a flag of a non-adherent country to the regulations upon radiotelegraphs of the Convention of London as well as those addressed to ships of such countries shall be transmitted by Brazilian stations only in cases where the respective country has previously declared that it will conform to those rules and regulations in the adjustment of accounts.

ART. 20.—When the Ministries of Marine or War have to establish radiotelegraphic stations for special ends in strategic points and fortified places, on land or sea, they will proceed in agreement with each other and with the Ministry of Ways and Public Works when choosing of the site and deciding upon the manner of carrying out the work, to the end that they shall not interfere with their mutual traffics.

These stations may be worked by telegraphists of the civil administration.

Whilst civil functionaries man the stations established in strategical or fortified places they shall be subject to military regime.

ART. 21.—All coastal radiotelegraph stations worked by the Department of General Tele-

graphs must receive and transmit meteorological observations, and there must be provided installations at one or more stations of the apparatus necessary to transmit time signals in the manner established by the Time Conference held in Paris in October, 1912.

Sole Paragraph.—The national ships provided with apparatus for wireless telegraphy and the foreign ships in the same condition can signal to the coast stations when they are within reach of them their observations about the weather, which will be communicated to the Meteorological Observatory of Rio de Janeiro, and to the ships, on the other hand, will be communicated the observations from that Observatory.

ART. 22.—To the radiotelegraphic service of Brazil are applicable the International Radiotelegraphic Convention held in London and the rules which may be laid down for the execution of the present law.

ART. 23.—The adjustment of accounts shall be made six-monthly between the Department General of Telegraphs and the agencies of the companies of national and foreign ships, and in their absence with the administrations to which those ships are attached in accordance with what is established by Art. XLII. of the International Regulations (revised in London).

ART. 24.—The call letters of the stations on board the national war and merchant ships will be distributed by the Department of General Telegraphs in accordance with the series of indicators reserved for Brazil by the Secretary of the International Union of Telegraphs of Berne.

ART. 25.—The radiotelegraphic stations in the interior of the country shall be established and worked by the Department of General Telegraphs, organising proper radiotelegraphic districts in regions where there are none, connecting them with the telegraphic service by means of wired lines and working with a parallel service of wired telegraphs.

ART. 26.—Annulling all whatsoever acts in this connection effected by the Government prior to the promulgation of the present law.

ART. 27.—It shall be the sphere of the Ministry of Ways and Public Works to make provision for the establishment and initiation of an international radiotelegraphic service and with the adjoining countries as well as the drawing up of the basis of a definite agreement and referendum to the National Congress.

ART. 28.—All previous acts to the contrary are revoked.

DECREE No. 3,316

(Extract from).

HIncluded in a Finance Bill, passed by Congress, signed and put into operation by the President of the Brazilian Republic on August 16th, 1917; we find a clause dealing with wireless telegraphy which authorises the Government to—

"Complete the services of Telegraphy, Radiotelegraphy, and Telephony, to establish all the communications necessary for Military and Naval service."

The final clause of this same Act makes the following provision, which would appear likely to have some special reference to Decree No. 3296 of the 10th July, 1917: "Revoke all dispositions to the contrary."

PROJECT No. 367. 1919.

IFor the organisation of the Radiotelegraph Service of the National Army.

The Radiotelegraph Service of the Army was created in 1914, and includes all the fixed radiotelegraph stations belonging to the Ministry of War, with a cadre of 30 radiotelegraphists for the purpose of operating them.

The Director of this service is a first lieutenant of the first Battalion of Engineers.

The cadre comprises 10 radiotelegraphists of the first and 20 of the second class.

From 1914 to the present time no modification has been made in the organisation of this important service, the regular working of which requires remodelling for the improvement of the technical conditions, in view of the extent it has assumed by reason of the acquisition of field radiotelegraph material, and the ever increasing employment of this means of communication between the various sections of the army.

The original organisation no longer satisfies the present radiotelegraphic requirements as regards field and fixed stations.

The recent acquisition of 16 field stations has brought with it the necessity for equipping them with qualified radiotelegraphists in order to ensure their perfect working and maintenance.

It is evident that these radiotelegraphists must possess certificates of competency, issued by the School of the General Administration of Telegraphs, or by other schools also authorised to work in the country, in conformity with the legislation in force.

Furthermore, the maintenance of radiotelegraph material renders necessary the establishment of a complete depot for the repair of any damage and the adjustment of apparatus.

To meet all these exigencies I propose the following:

PARLIAMENTARY BILL.

The National Congress decrees:

ART. 1.—The Radiotelegraph service of the Army is composed of:

(*a*) Fixed radiotelegraph stations of the National Army.

(*b*) A radiotelegraph school similar to the School of the General Administration of Telegraphs, to prepare, theoretically and practically, the necessary radiotelegraphists for the service of the fixed stations and the field stations of all arms.

(*c*) A material depot to supply all stations.

ART. 2.—The direction of the radiotelegraph service will devolve upon the Commander of the first battalion of engineers, who will have as auxiliaries two subaltern officers of the Engineers.

ART. 3—The school of Radiotelegraphy will work in the first Battalion of Engineers.

ART. 4.—The following shall be the personnel of the radiotelegraph service:

7 radiotelegraphists of the first class and 14 of the second class for the fixed stations.

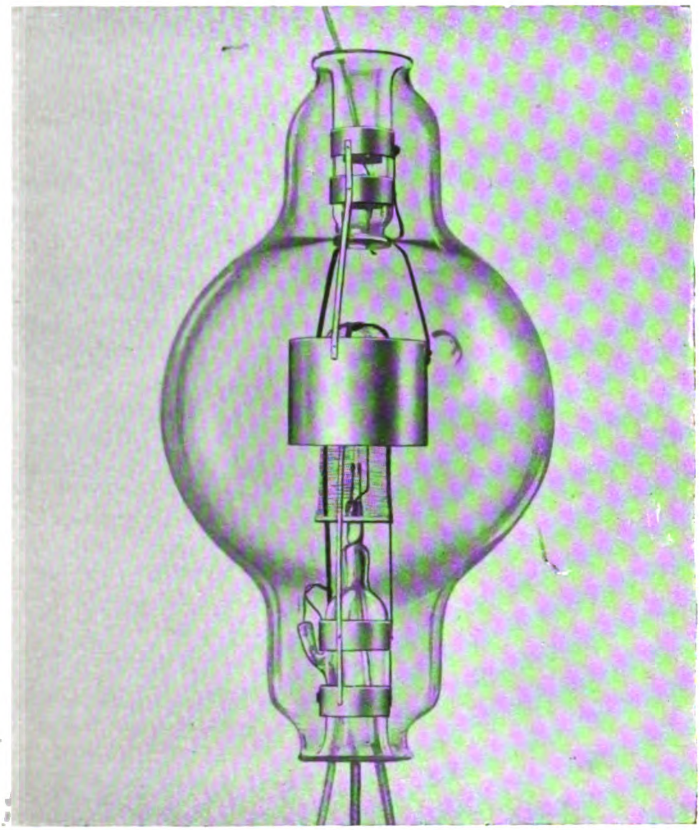
1 assistant administrative technician, first class radio.

1 assistant of the radiotelegraph school, of the first class.

1 assistant instructor of the military school, of the first class.

1 first-class radiotelegraphist at the school of aviation.

6 officers in charge of field stations, radios of second class.



MARCONI THREE-ELECTRODE TRANSMITTING VALVE, TYPE M.T.I.

[To face page 144

2 second-class radiotelegraphists in the school of aviation.

1 second sergeant electrical mechanic, one chief mechanic and three soldier auxiliaries, for the workshops and depots.

ART. 5.—For the organisation of the workshops, depots and radiotelegraph school, the Government shall be authorised to spend the amount of 20 : 000$000, and an annual allowance of 4 : 000$000 to meet the expenses of maintenance, repairs and cleaning of material, and minor expenses.

ART. 6.—The auxiliaries of the director of the radiotelegraph service shall be the supplementary cadre of the Engineers.

ART. 7.—Radiotelegraphists of the first class shall receive the pay of "Sargento ajudante," those of the second class shall receive the pay of first sergeant, plus the daily allowance of 2$000.

ART. 8—Auxiliaries shall receive the pay of their class, plus a daily allowance of 3$000 and shall be appointed by competitive examination.

ART. 9.—The number of radiotelegraphists of the first and second classes is subject to variation according to the number of stations in operation, in the ratio of one of the first class and two of the second class for each station.

ART. 10.—The Government shall pass this Bill into law.

ART. 11.—All provisions to the contrary are hereby revoked.

Sala das sessoes, 22nd September, 1919.
OCTAVIO DA ROCHA.

BRITISH EAST AFRICA

(See EAST AFRICAN PROTECTORATE.)

BRITISH GUIANA

THIS Colony, which includes the counties of Demerara, Essequibo and Berbice, lies on the north-east coast of South America, and has a total area of 90,277 square miles. The government is administered by a Governor with a Court of Policy consisting of fifteen other members, seven official and eight elected.

CONTROL AND ORGANISATION.

Both the ownership and working of all radiotelegraphic stations are vested in the Government. Only one station is open for public correspondence with ships.

ADMINISTRATION.

The administration of wireless telegraphy is carried out under the following regulations :—

A—The Telegraph Ordinance, 1903.
B—Ordinance No. 7 of 1910.

A This Ordinance may be cited as "The Telegraph Ordinance, 1903."

2. In this Ordinance "telegraph" means an electric, galvanic, or magnetic telegraph, and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communication by means of electricity, galvanism or magnetism, whether the same be transmitted by means of wires or cables or without wires or cables.

3. The Governor-in-Council shall have the exclusive privilege of establishing, maintaining and working telegraphs between the Colony and places outside of the Colony.

Provided that the Governor-in-Council may grant a licence on such conditions and in consideration of such payments as he thinks fit, to any person, company or body corporate, to establish, maintain or work a telegraph between the Colony and any place or places outside the Colony: and

Provided that nothing in this Ordinance shall apply to or in any way affect the rights already granted to the West India and Panama Telegraph Company, Limited, under any Ordinance or Ordinances passed before the Commencement of this Ordinance.

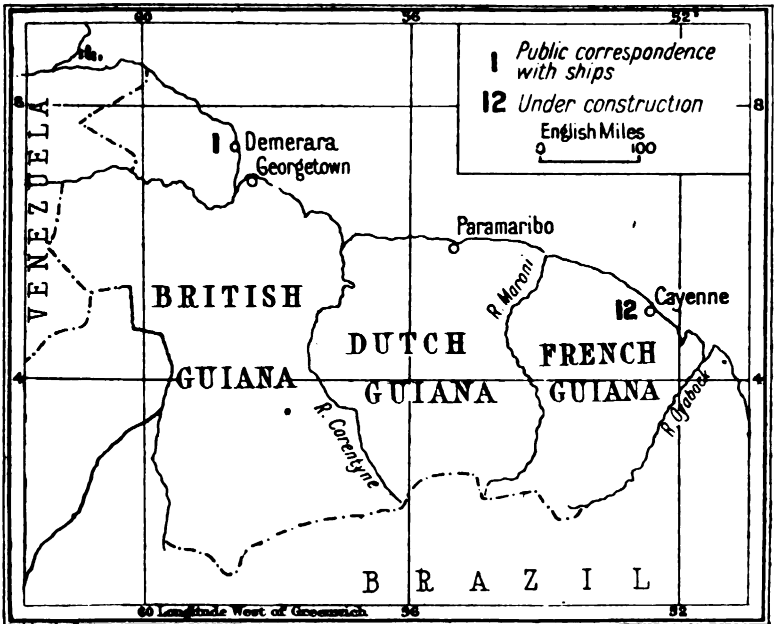
B ORDINANCE NO. 7 OF 1910.

1. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship registered in the Colony, except under and in accordance with a licence granted in that behalf by the Governor-in-Council.

(2) A person shall not work any apparatus for wireless telegraphy installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor-in-Council, and the Governor-in-Council may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations, not exceeding fifty dollars for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding fifty dollars, and, on conviction on indictment, to a fine not exceeding five hundred dollars, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

(4) If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence



in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under sub-section two of this section, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Governor or the Postmaster-General and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

(5) The expression "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: Provided, That nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1910.

BRITISH HONDURAS

THE Crown Colony of British Honduras lies in Central America within 18° 29′ 5″ to 15° 53′ 55″ N. latitude and 89° 9′ 22″ to 88° 10′ W. longitude. Its extreme length and breadth are 174 miles and 68 miles respectively; it abuts on the Atlantic, and is bounded on the north by Yucatan (Mexico), on the west and south by Guatemala, and on the east by the Caribbean Sea. The total area is about 8,598 square miles.

CONTROL.

Wireless telegraphy has seen some developments here since its first introduction, and both the ownership and working of the one radiotelegraphic station are vested in the Government. An experimental licence has been granted to S. John's Roman Catholic College in Form 2 issued by H.B.M. Postmaster-General in 1905. The station at Belize not only communicates with ships, but also handles traffic for the United States and United Kingdom through the United Fruit Company's relay station at Swan Island (see map of West Indies). The local toll of the station is ten cents per word.

The through rate to any point in the United States is 35 cents per word and to the United Kingdom 2s. 6d.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address*
Gerald S. W. Smith	Colonial Postmaster	Belize
P. S. Berry	Superintendent of Wireless Telegraphs ..	Do.

During the war no privately-owned apparatus was allowed in the Colony, but laws are being prepared for the regulation in accordance with the London Convention of 1912.

ADMINISTRATION.

The administration of wireless telegraphy is carried out under the following regulations :—

A—Consolidated Law
B—Schedule.

Wireless telegraphy in British Honduras is regulated by Chapter CXCIX. of the Consolidated Laws of British Honduras (revised edition), the text of which will be found below.

CHAPTER CXCIX. OF THE CONSOLIDATED LAWS OF BRITISH HONDURAS (REVISED EDITION).

TO REGULATE WIRELESS TELEGRAPHY.

A

1. *Interpretation.*—In this chapter "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2. *Licence to Instal, &c., Wireless Telegraphic Apparatus.*—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine and shall contain the terms, conditions and restrictions on and subject to which it is granted.

3. *Apparatus not to be worked on merchant ship except in accordance with regulations.*—A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this chapter.

4. *Regulations.*—(1) The Governor may from time to time make regulations for carrying into effect the purposes of this chapter, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this chapter.

(2) The regulations in the schedule to this chapter shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

5. *Search Warrants.*—If a District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship contrary to the provisions of this chapter or of any regulations made under this chapter, or of any licence granted under this chapter, he may grant a search warrant to any police officer or any person appointed in that behalf by the Superintendent of Police and named in the warrant and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. *Penalty for contravention of chapter.*—(1) Any person who shall offend against any provision of this chapter or any regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding two hundred and fifty dollars, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

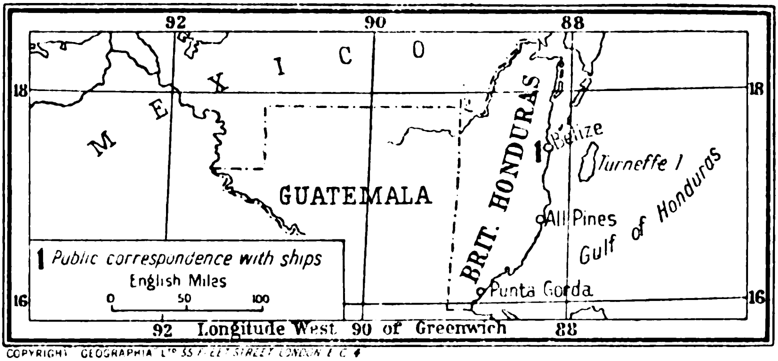
(2) *Procedure.*—Proceedings shall be taken before the District Commissioner for the Belize District on the complaint of the Superintendent of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

SCHEDULE—Section 4 (2).

REGULATIONS.

B

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with



(a) Naval signalling, or

(b) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

ii. In these regulations "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

iii. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

iv. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

v. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

vi. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

BRITISH NORTH BORNEO

(See Borneo, British.)

BRITISH SOMALILAND

THE Somali coast, lying south of the Red Sea, and stretching from Lahadu to Bandar Ziyava (49° east longitude), is administered by a British Commissioner. Egyptian control ceased in 1884, and the territory then fell under the administration of the Indian Government. It was taken over by the Foreign Office on October 1st, 1898, and was transferred to the Colonial Office on April 1st, 1905. The area comprises about 68,000 square miles, which support a population of about 300,000 Mohammedans, mainly nomadic, except on the coast, where British occupation has brought into existence some fair-sized towns supporting an urban population. The boundary has been settled by agreement between France, Italy, and Abyssinia. The chief ports are Berbera, Bulhar, and Zeyla.

CONTROL.

The control of wireless telegraph operations is vested in the Posts and Telegraphs Department.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
W. D. Lacey	Director, Posts and Telegraphs	Berbera
C. V. Magill	Asst. Director of Posts and Telegraphs	Do.
A. J. S. Culpeper	Superintendent of Telegraphs	Do.
H. C. Johnson	Engineer	Do.

ORGANISATION.

Originally radiotelegraphy was introduced, and the Protectorate placed in telegraphic communication with the outside world, more with a view to administrative than commercial purposes. The first stations were erected in 1910 at Berbera and Aden (on the Asiatic Coast), the latter being in telegraphic communication with the Eastern Telegraph Company's Aden Station. Subsequently other stations were erected, at Bulhar (1913), at Burao (1916), at Las Dureh (1918), and at Hargeisa (1919).

Burao is military headquarters, Las Dureh is an outpost station on the edge of Mullahs country and proved most useful by giving the camel corps information of a dervish raid which enabled the retreat to be cut off. Las Dureh communicates directly with Berbera and Burao.

A new station has been erected at Hargeisa, 110 miles S.W. of Berbera, for interior working. Hargeisa is a District Commissioner's headquarters which is now in direct communication with Berbera and Burao.

Bulhar station has been temporarily closed.

Mobile stations are projected for Zeila and Las Khorai on the coast.

The latest available statistics enumerate: Six land stations (including Aden) (fixed) directly controlled by Government, and one portable land station (a ½ kw. camel pack set) also under Government control. Internal communication is on a 900-metre wave to avoid interference in the Gulf of Aden.

ADMINISTRATION.

The first Ordinance to regulate radiotelegraphy in the Somaliland Protectorate was passed in 1908. It was called Ordinance No. 6 of 1908, and enacted that the full control of radiotelegraphy should be vested in the Commissioner, and any person contravening his regulations should be liable on conviction to a fine not exceeding £100 or imprisonment for 12 months, together with confiscation of his apparatus. A new Ordinance repealing the above was passed in 1913, and appears *in extenso* below. This constitutes the extant governing decree under which wireless is at present administered.

We append the text of the following:—

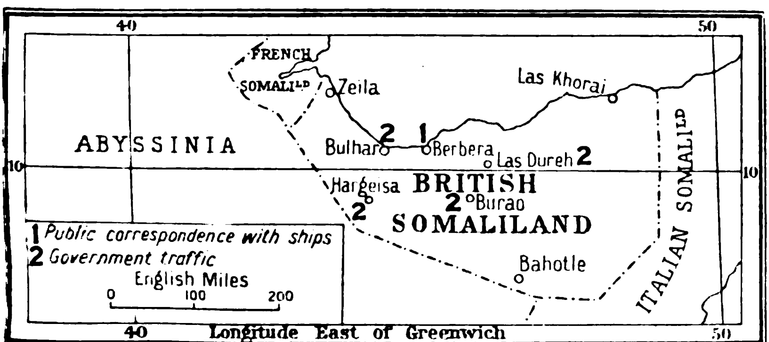
A—Wireless Telegraphy Ordinance, 1913.
B—Regulations thereunder.

ORDINANCE.

A 1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which messages or other communications are sent or received. Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Protectorate, except under and in accordance with a licence granted in that behalf by the Commissioner.



(2) Every such licence shall be in such form and for such period as the Commissioner may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Protectorate, otherwise than in accordance with regulations under this Ordinance.

5. (1) The Commissioner may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Commissioner, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Protectorate shall be subject to such further regulations as may be made by the Commissioner from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance, or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the District Commissioner and named in the warrant, and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding rupees seven hundred and fifty, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before the District Court, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraphs Ordinance, 1908, is hereby repealed.

SCHEDULE.—Section 5 (2).

Regulations.

B. i. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Protectorate shall be worked in such a way as not to interfere with—

(a) Naval signalling, or

(b) The working of any wireless telegraph station lawfully established, installed or worked in the Protectorate or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless stations established on ships at sea.

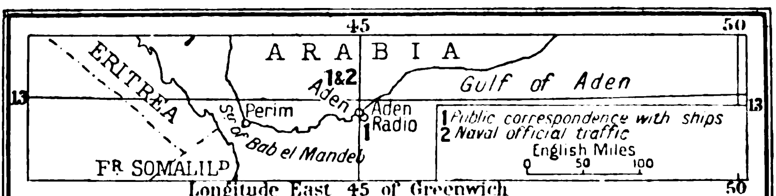
ii. In these regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

iii. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Protectorate, except with the special or general permission of the Commissioner.

iv. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

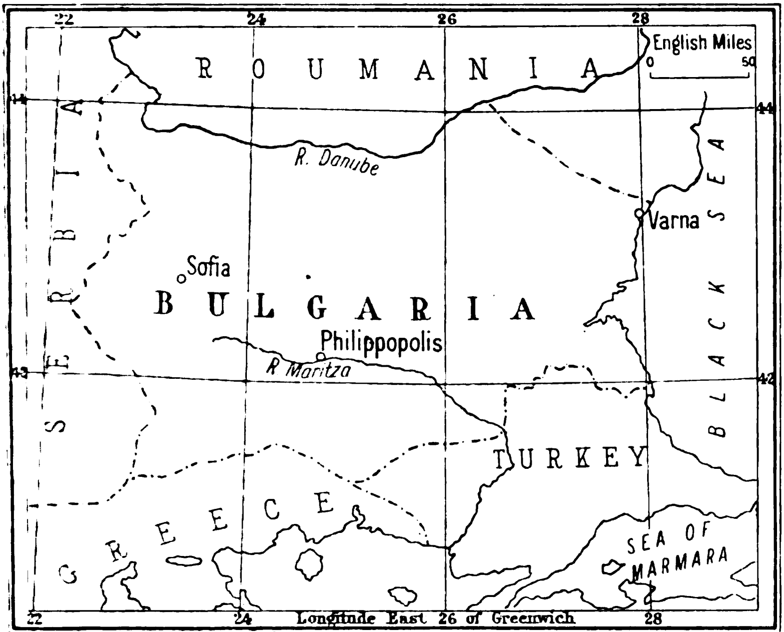
v. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

vi. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.



BULGARIA

BULGARIA, which, until the advent of the late war, constituted one of the most important of the Balkan States, is still in so unsettled a state



that it is not possible to give any particulars relating to wireless telegraphy, but it is hoped in our next issue that it may be possible to print the text of any laws or regulations governing the administration of wireless in that country.

CONTROL.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Nicholas Startcheff ..	Director General of Posts, Telegraphs and Telephones	Sofia

BURMA

(See INDIA.)

CAMEROONS

IT has not yet been possible to obtain from the new administrators particulars of any laws and regulations governing wireless telegraphy in this ex-German territory, but it is hoped to include these in the next edition of our Year-Book.

CANADA

THE Dominion of Canada possesses a land area of 3,603,910 miles. It was originally discovered by Cabot, in 1497, then settled by the French in the seventeenth century, and finally annexed to the British Empire in 1763. Its establishment as a Dominion dates from July 1st, 1867. The executive power is vested in a Governor-General appointed by the sovereign and aided by a Privy Council.

CONTROL.

The Marconi Company is the only commercial concern manufacturing and operating wireless telegraph apparatus in Canada.

The following stations on the East Coast, formerly operated by the Marconi Wireless Telegraph Company, were taken over at various periods, and are now operated by the Department of the Naval Service : Camperdown (Nova Scotia) ; North Sydney (Nova Scotia) ; Point Riche (Newfoundland) ; and Sable Island (Nova Scotia).

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
The Hon C. C. Ballantyne ..	Minister of Marine and of the Naval Service	Department of Naval Service, Ottawa, Ont.
Mr. G. J. Desbarats, C.M.G...	Deputy Minister of the Naval Service	Department of Naval Service, Ottawa, Ont.
Lieut.-Commander C. P. Edwards	General Superintendent, Government Radiotelegraph Service	Department of Naval Service, Ottawa, Ont.
Mr. W. A. Rush	Chief Inspector, Government Radiotelegraph Service	Department of Naval Service, Ottawa, Ont.

ORGANISATION.

According to the latest available information, there are 439 radiotelegraph installations, classified as follows :—

Government Commercial Stations	2
Coast Stations	47
Government Ship Stations	50
Licensed Ship Stations	130
Public Commercial Stations	2
Private Commercial Stations	10
Licensed Radiotelegraph Schools	15
Licensed Experimental Stations	6
Licensed Amateur Experimental Stations	174
Direction Finding Stations	3
Total	439

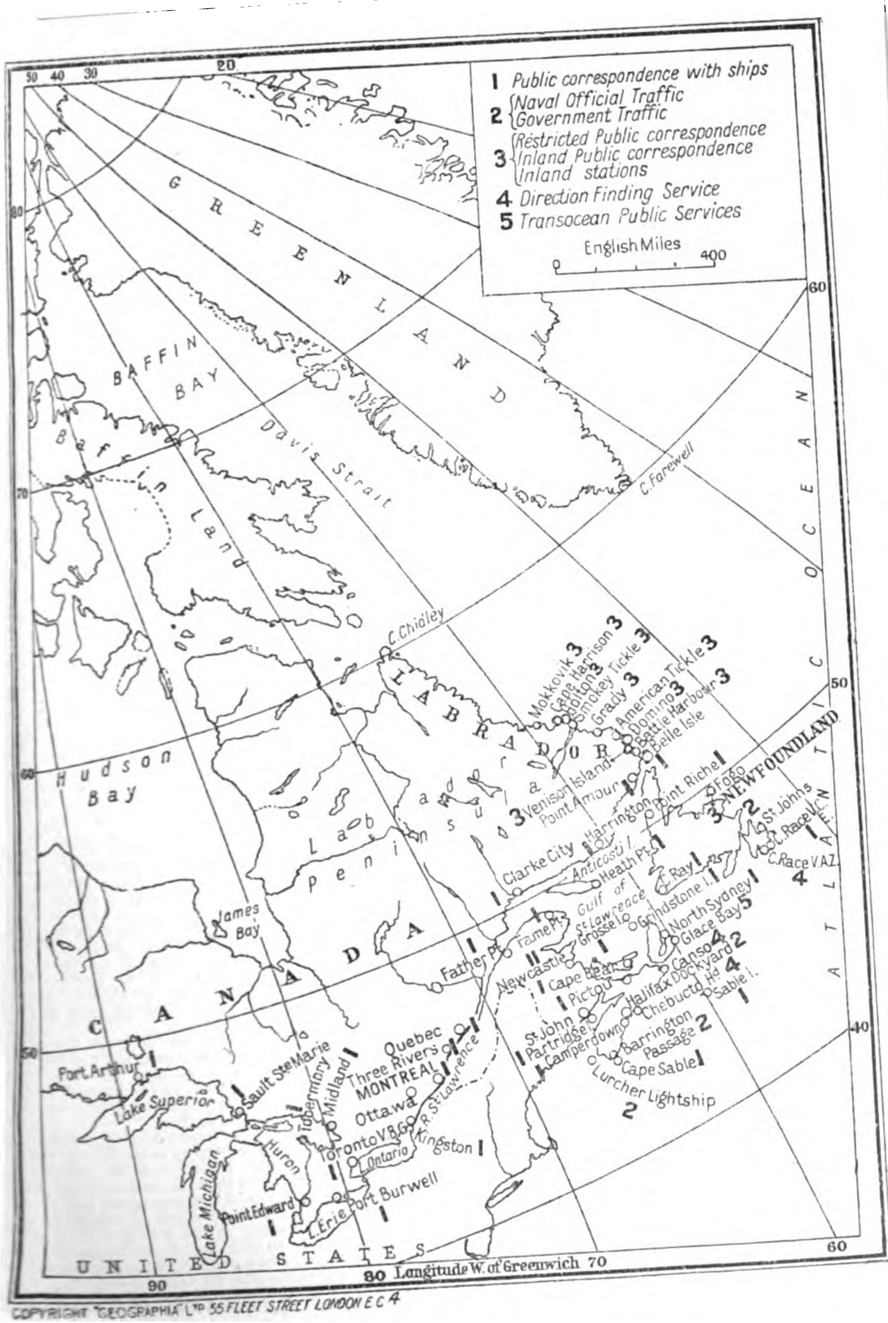
The first wireless station was erected by the Marconi Wireless Telegraph Company for the Government at Fame Point, Quebec. This station was erected in July, 1904, and during the same summer stations were erected at Heath Point, Anticosti, and Point Amour, Labrador, and on the Island of Belle Isle at the Atlantic entrance to the Straits of Belle Isle. The programme of construction was carried on almost without a break, and, as will be noted in the above table, there are now 47 coast stations in Canada.

The Department requires that all those entering the Radiotelegraphic Service as operators should pass a proficiency examination to determine their qualifications prior to acceptance, and announces that applications for entry as operators in the Radiotelegraph Service should be addressed to—

"The Deputy Minister,
Naval Service Department,
Ottawa."

During the late war, on account of "the confidential nature of the messages passing through the hands of the radiotelegraph operators, and the "secret instructions with which they must be entrusted during the present "time," it was considered advisable to enlist in the Royal Naval Canadian Volunteer Reserve all the wireless operators in the employment of the Department. For this purpose a special rank of wireless operator was instituted, and regulations were drawn up to meet the requirements in this connection. The operators have now been enlisted in the R.N.C.V.R.

The above-mentioned report also states that "in addition to its regular


1 Public correspondence with ships
2 Naval Official Traffic
Government Traffic
3 Restricted Public correspondence
Inland Public correspondence
Inland stations
4 Direction Finding Service
5 Transocean Public Services
English Miles
0 400
GREENLAND
BAFFIN BAY
Baffin Land
Davis Strait
C. Farewell
C. Chidley
LABRADOR
Labrador peninsula
Hudson Bay
James Bay
CANADA
NEWFOUNDLAND
ATLANTIC OCEAN
Gulf of St Lawrence
Lake Superior
Huron
Lake Michigan
L. Ontario
L. Erie
UNITED STATES
Longitude W. of Greenwich
COPYRIGHT "GEOGRAPHIA" LTD 55 FLEET STREET LONDON E C 4

"work the Radiotelegraph Service has on many occasions been instrumental "in obtaining assistance for vessels in distress and in communicating instruc- "tions from their owners."

ADMINISTRATION.

Radiotelegraphy in the Dominion was, until 1913, regulated by a section of the Telegraphs Act (see YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pages 111 and 112). This is now replaced by the Act which was assented to on June 6th, 1913, printed in the following pages. Regulations for the working of aircraft equipments are being drafted, but the text is not yet available. As matters at present stand, we may usefully divide the rules governing the administration and procedure as far as wireless telegraphy is concerned into the following:—

A—The Radiotelegraph Act, Chapter 43 of the 1913 Statute.
B—Regulations issued by the Governor-in-Council.
C—Regulations issued by the Minister of the Naval Service.
D—Limited coast station licence.
E—Public commercial licence.
F—Private commercial licence.
G—Experimental licence.
H—Amateur experimental licence.
I—Ship licence.

THE RADIOTELEGRAPH ACT.

PART IV.

A 1. This Act may be cited as *The Radiotelegraph Act.*

2. In this Act, unless the context otherwise requires—

(*a*) "Minister" means the Minister of the Naval Service;

(*b*) "radiotelegraph" includes any wireless system for conveying electric signals or messages including radiotelephones;

(*c*) "coast station" means any radiotelegraph station which is established on land or on board a ship permanently moored and which is used for the exchange of messages and electric signals with ships at sea;

(*d*) "land station" means any radiotelegraph station or installation of radiotelegraphic apparatus which is not a coast station or a ship station;

(*e*) "ship station" means any radiotelegraph station established on board a ship which is not permanently moored.

3. No person shall establish any radiotelegraph station or instal or work any radiotelegraph apparatus in any place in Canada or on board any ship registered in Canada except under and in accordance with a licence granted in that behalf by the Minister.

4. From and after the first day of January, nineteen hundred and fourteen, no passenger steamer, whether registered in Canada or not—

(*a*) licensed to carry 50 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 200 nautical miles from one port or place to another port or place; or,

(*b*) licensed to carry 250 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 90 nautical miles from one port or place to another port or place; or

(*c*) licensed to carry 500 or more persons, including passengers and crew, and going on any voyage which is or which includes a voyage of more than 20 nautical miles from one port or place to another port or place—shall leave or attempt to leave any Canadian port unless such steamer is equipped with an efficient radiotelegraph apparatus, in good working order, capable of transmitting and receiving messages over a distance at least one hundred nautical miles by night and by day, and in charge of a person fully qualified to take charge of and operate such apparatus.

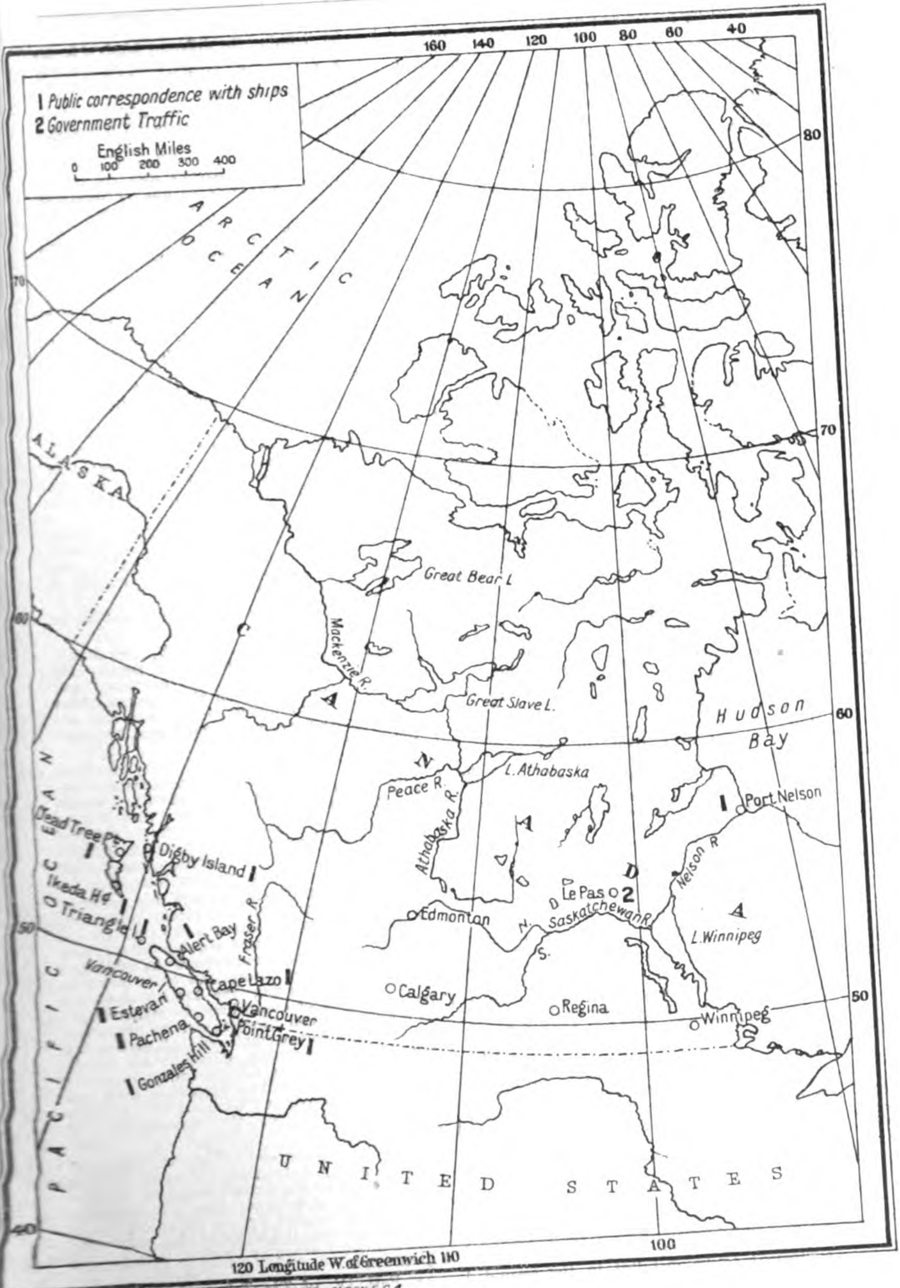
(2) The owner, master or other person in charge of any passenger steamer which leaves or attempts to leave any Canadian port contrary to the provisions of this section shall, on summary conviction, be liable to a fine not exceeding $1,000 and costs, and such fine and costs shall constitute a lien upon such passenger steamer.

(3) This section shall not apply to passenger steamers plying on the rivers of Canada, including the River St. Lawrence as far seaward as a line drawn from Father Point to Point Orient, or on the Northumberland Straits, or on the Georgian Bay, or on the lakes of Canada other than Lakes Ontario, Erie, Huron and Superior, and the provisions of paragraph (*c*) of subsection I. of this section shall not apply to steamers making voyages on Lakes Ontario, Erie, Huron and Superior, the regular route for which is not at any point more than seven miles from the shore.

(4) This section shall not apply to steamers calling at Canadian ports solely for the purpose of obtaining bunker coal or provisions for the use of such steamer, or through stress of weather, or for repairs.

5. All persons operating land or cable telegraph lines shall transmit all messages destined to or coming from ship stations via coast stations under such rules as may be made by the Board of Railway Commissioners for Canada.

6. No one shall be employed as a radiotelegraph operator at any coast or land station unless he is a British subject, and all radiotelegraph operators at shore or land stations, or on ship stations on board any vessel registered in Canada, shall take and subscribe a Declaration of Secrecy in the form set forth in the Schedule to this Act, before a judge of any court, a notary public, a justice of the peace or a commissioner for taking affidavits, having authority or jurisdiction within the place where the oath is administered.


1 Public correspondence with ships
2 Government Traffic
English Miles
0 100 200 300 400
ARCTIC OCEAN
ALASKA
CANADA
PACIFIC OCEAN
Great Bear L
Mackenzie R.
Great Slave L.
Hudson Bay
L. Athabaska
Peace R.
Athabaska R.
Port Nelson
Nelson R
Dead Tree Pt.
Digby Island
Ikeda Hd
Triangle
Alert Bay
Fraser R.
Vancouver I.
Cape Lazo
Estevan
Vancouver
Pachena
Point Grey
Gonzales Hill
Edmonton
Calgary
Le Pas 2
N. Saskatchewan R.
S.
Regina
L. Winnipeg
Winnipeg
UNITED STATES
120 Longitude W. of Greenwich 110
100

(2) Every person who has made the Declaration of Secrecy and who, either directly or indirectly, divulges to any person, except when lawfully authorised or directed so to do, any information which he acquired by virtue of his employment, is guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $100 and to imprisonment for a term not exceeding six months.

7. Any person who sends or transmits or causes to be sent or transmitted any false or fraudulent distress signal, message, call or radiogram of any kind, or who without lawful excuse interferes with or obstructs any radiocommunication, shall be guilty of an offence and shall be liable on summary conviction to a penalty not exceeding $500 and costs or six months' imprisonment.

8. If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a radiotelegraph station has been established without licence in that behalf, or that any apparatus for radiotelegraphy has been installed or worked in any place or on board any ship registered in Canada within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Minister and named in the warrant.

(2) A warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship and to seize any radiotelegraph apparatus which appears to him to be there used or intended to be there used for radiotelegraphy.

9. Everyone who establishes a radiotelegraph station or instals or works any radiotelegraph apparatus in violation of the provisions of this Act, or of any regulation made hereunder, shall be liable on summary conviction to a penalty not exceeding $50, and on conviction on indictment to a fine not exceeding $500 and to imprisonment for a term not exceeding twelve months, and in either case shall be liable to forfeit to His Majesty any radiotelegraph apparatus installed or worked without a licence.

(2) No proceedings shall be taken against any person under this section, except by order of the Minister.

10. The Governor-in-Council may—

(*a*) prescribe the tariff of fees to be paid for licences and for examination for certificates of proficiency held and issued under the provisions of this Act;

(*b*) accede to any international convention in connection with radiotelegraphy, and make such regulations as may be necessary to carry out and make effective the terms of such convention and prescribe penalties recoverable on summary conviction for the violation of such regulations; provided that such penalties shall not exceed $500 and costs;

(*c*) make regulations for the censorship and controlling of radiotelegraph signals and messages in case of actual or apprehended war, rebellion, riot or other emergency.

11. The Minister may make regulations—

(*a*) prescribing the form and manner in which applications for licences under this Act are to be made.

(*b*) classifying ship, coast and land stations and prescribing the type and range of the regular equipment and the emergency equipment to be installed in the several classes of stations;

(*c*) defining the different kinds of licences that may be issued, their respective forms and the several periods for which they shall continue in force;

(*d*) prescribing the conditions and restrictions to which the several licences shall respectively be subject;

(*e*) prescribing the different classes of certificate of proficiency and the class of certificate necessary to qualify persons as operators for the several classes of ship, coast and land stations;

(*f*) for the examination of persons desiring to obtain certificates of proficiency as radiotelegraph operators and to determine the qualifications in respect of age, term of service, skill, character and otherwise to be required for such certificates;

(*g*) prescribing the watches to be kept by operators and the number of operators to be maintained and kept at the different classes of ship, coast and land stations;

(*h*) for the inspection of radiotelegraph stations;

(*i*) to provide how radiotelegraph apparatus installed upon any foreign or British ship (whether such British ship is registered in Canada or elsewhere) shall be operated while such ship is within the territorial waters of Canada;

(*j*) to compel all radiotelegraph stations to receive, accept, exchange and transmit signals and messages with such other radiotelegraph stations and in such manner as he may prescribe;

(*k*) for the effective carrying out of the provisions of this Act.

(2) The Minister may, by regulation, authorise the imposition of a penalty not exceeding fifty dollars and costs or three months' imprisonment for the violation of any regulation made under this section, and any such penalty may be recovered upon summary conviction.

12. All regulations made under the provisions of the two sections immediately preceding shall be published in *The Canada Gazette*, and shall be laid before both Houses of Parliament within ten days after the publication thereof if Parliament is then sitting, and if Parliament is not then sitting, then within ten days after the next meeting thereof.

13. His Majesty may, at any time, assume, and for any length of time retain, possession of any radiograph station and of all things necessary to the sufficient working thereof, and may for the same time, require the exclusive service of the operators and other persons employed in working the same; and the person owning or controlling the station shall give up possession thereof, and the operators and other persons so employed shall, during the time of such possession, diligently and faithfully obey such orders, and transmit and receive such signals, calls and radiograms as they are required to receive and transmit by any duly authorised officer of the Government of Canada.

(2) If the Minister and the person owning or controlling any radiotelegraph station taken possession of by the Crown under the provisions of this section cannot agree as to the compensation to be paid by the Crown for such taking possession, the Minister shall refer the matter to the Exchequer Court of Canada for adjudication.

14. Part IV. of *The Telegraph Act* is repealed.

SCHEDULE.

DECLARATION OF SECRECY.

I, A. B., solemnly and sincerely promise and declare that I will faithfully and honestly fulfil the duties which devolve upon me as radiotelegraphic operator, and that I will not, either directly or indirectly, divulge to any person, except when lawfully authorised or directed so to do, any information which I acquire by virtue of my employment as such operator, or which may come to my knowledge through the operation of any radiotelegraphic installation

Declared before me at...............
this...day of............, 19....
[*Signature of declarant.*]

REGULATIONS.

Issued by the Governor in Council.

Be Approved by the Governor in Council and issued in accordance with Section 10 of the Radiotelegraphic Act, Chapter 43, Statutes 1913.

1. *Fees for Licences.*—The annual fees to be paid in respect of licences issued by the Minister of the Naval Service, for the installation and operation of radiotelegraph stations in the Dominion of Canada, or on board any ship registered in Canada, shall be as follows :—

	$
1. Limited Coast stations	10.00
2. Public Commercial stations	50.00
3. Private Commercial stations	10.00
4. Experimental stations	5.00
5. Amateur Experimental stations	1.00
6. Technical or Training School stations	1.00
7. Ship stations	1.00

2. *Fees for Examinations.*—The fees to be paid in respect of examinations for "Certificates of Proficiency in Radiotelegraphy" shall be as follows, for each examination or re-examination :—

	$
1. Extra First-class certificate	1.00
2. First-class certificate	1.00
3. Second-class certificate	1.00
4. Third-class certificate	0.50
5. Experimental certificate	1.00
6. Amateur certificate	Nil.

3. *London Convention.*—(i) The provisions of the International Radiotelegraph Convention of London, 1912, and of the regulations annexed thereto, shall be observed by all "coast stations" established in Canada and by all "ship stations" on board any vessel registered in Canada.

(ii) *Penalty.*—Any person who installs or works any radiotelegraph apparatus at any of the above mentioned stations in violation of this regulation, shall be liable on summary conviction to a fine not exceeding five hundred dollars ($500) and costs.

Control of Stations in Case of Emergency.

4. (i) *Coast and Land Stations.*—If, and whenever in the opinion of the Minister an emergency shall have arisen in which it is expedient for the public service that the Government shall have control over the transmission of messages by the apparatus of any coast or land station, it shall be lawful for the said Minister, by warrant under his hand, to direct and cause so much of the apparatus as is within Canada or the territorial waters thereof, or any part of the apparatus, to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's Service and subject thereto for such ordinary services as to the said Minister may seem fit, and in that event, any person, authorised by the said Minister, may enter upon the stations, offices and works of any coast or land station or any of them and take possession thereof and use the same as aforesaid.

(ii) The Minister may, when he considers such an emergency as aforesaid to have arisen, instead of taking possession of such coast or land station, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the apparatus of such station, either wholly or partly and in such manner as he may direct, and such persons may enter upon the station premises accordingly, or the said Minister may direct the owner or his representative to submit to him or any person authorised by him all messages tendered for transmission or arriving by the apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said Minister may prescribe, and the owner or his representative shall obey and conform to all such directions.

(iii) The Minister may, when he considers such emergency as aforesaid to have arisen, close any coast or land station and cause the removal therefrom of the apparatus or any part thereof.

5. (i) *Ship Stations.*—If, and whenever, in the opinion of the Minister, an emergency shall have arisen in which it is expedient for the Public Service that the Government shall have control over the transmission of messages by the apparatus of a radiotelegraph station on board any Canadian registered vessel, it shall be lawful for the said Minister, by warrant under his hand to direct and cause the apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's Service and, subject thereto, for such ordinary services as to the said Minister may seem fit, and in that event, any person authorised by the said Minister may enter upon any ship station and take possession thereof and use the same as aforesaid.

(ii) When the Minister considers such an emergency as aforesaid to have arisen, he may, instead of taking possession of such ship station, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the apparatus of such station, either wholly or partly, and in such manner as he may direct, and such persons may enter upon the station premises accordingly or the said Minister may direct the owner or his representative to submit to him or any person authorised by him all messages tendered for transmission or arriving by the apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said Minister may prescribe, and the owner or his representative shall obey and conform to all such directions.

NAVAL MINISTER'S REGULATIONS.

Issued by the Minister of the Naval Service in accordance with Section 11 of the Radiotelegraphic Act, Chapter 43, Statutes 1913.

Licences.

1. *Application for Licence.*—Application for licences to install and operate radiotelegraph equipments at any point in the Dominion of Canada or on board

any ship registered therein, must be made to the Deputy Minister of the Department of the Naval Service, Ottawa, on the "Application for Licence" form, provided for that purpose, copies of which may be obtained on application to the above mentioned Department.

2. *Classes of Licences.*—The following classes of licences will be issued :—

1. Limited Coast station.
2. Public Commercial station.
3. Private Commercial station.
4. Experimental station.
5. Amateur Experimental station.
6. Technical or Training School station.
7. Ship station.

3. *Duration of Licences.*—Licences will be valid for one year, commencing on April 1st and expiring on March 31st of the following year. All licences issued during the year automatically expire on March 31st, unless otherwise specified in the licence.

4. *Limited Coast Licences.*—Limited coast licences will only be granted with respect to stations in localities not served by a regular Government coast station; such stations will be allowed to undertake a limited correspondence with ships at sea determined by the object of such correspondence. They must exchange public messages with such ship, coast and land stations as are designated in the licence, but with no other stations whatsoever.

For ship to shore working they must be operated in accordance with the provisions of the International Radiotelegraph Convention and they must employ such wave-lengths, below 600 metres or above 1,600 metres as are specified in the licence.

The watches to be maintained and the number and class of operators to be carried are to be as specified in the licence, the regular form of which is annexed hereto.

(Forms N. W. 42.)

5. *Public Commercial Licences.*—Public commercial licences will be granted to land stations open for public correspondence with certain other land stations designated in the licence, and may use such wave-lengths, within the following limits, as are specified therein :—

Below 200 metres.
,, 450 ,,
Above 1,900 ,,

The watches to be maintained and the number class of the operators to be carried are to be as specified in the licence, the regular form of which is annexed hereto. (Form No. W. 18.)

6. *Private Commercial Licences.*—Private commercial licences will be granted to land stations not open for public correspondence, and are limited to a certain specific commercial service defined in the licence; such stations may not exchange messages with stations other than those specified in the licence and no tolls may be levied or collected on account of any business transacted or messages sent to or from the station. This class of station may use such wave-lengths, within the limits prescribed in Regulation No. 5, as are specified in the licence.

Special Regulations for Experimental Stations.

8. Applicants for an experimental licence must state in their application what wave-length they desire to use; the following lengths being available :—

Below 200 metres.
,, 450 ,,
Above 1,900 ,,

In special cases and for short periods the Minister shall have power to permit the use of 300, 600 and 1,800 metres for the purpose of testing or demonstrating commercial apparatus, such permission to be given by letter under his hand.

9. The station is strictly limited to the use of such wave-length or wave-lengths as are specified in the licence.

10. When transmitting on wave-lengths of 100 metres or less the station must be worked by a person holding an amateur experimental certificate of proficiency (see Regulation No. 97), and when transmitting on wave-lengths greater than 100 metres it must, if it be within the range of any commercial or coast station, be worked by a person holding either a "first class," "second class," or "experimental" certificate of proficiency in radiotelegraphy. (See Regulations Nos. 93, 94 and 96.)

11. The power used, measured at the terminals of the transformer, must not exceed ½ k.w.

In special cases, however, such as that of a commercial company desirous of testing and demonstrating apparatus, or stations so far removed from any commercial station or route of navigation as to preclude any possibility of interference, the Minister may at his discretion permit the use of greater powers than ½ k.w.

12. The waves emitted must be as little damped as possible, and in no case shall the logarithmic decrement of a complete oscillation exceed two-tenths. The coupling between the primary and secondary of the oscillation transformer shall not be closer than that which gives a difference of five per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits.

13. A distinctive call signal will be allotted to each station, commencing with the letter "X," *e.g.*, XAA, XAB, which signal shall be sent not less than three times at the termination of every transmission.

14. The regulations of the International Radiotelegraph Convention must, where applicable, be observed, at the station.

15. The station, when operating, must listen for the signal "STP," which will indicate that an experimental station is interfering with commercial business.

The latter signal will only be made use of by certain authorised Government stations and will not be used unless absolutely necessary. The signal "STP" will, whenever possible, be preceded by the call signal allotted to the experimental station to which the interference is attributed and will be followed by the call signal of the Government station. On receipt of the "STP" signal, experimental stations will absolutely cease to operate until the Government station gives the signal "Cancel STP."

16. The aerial must be connected to the transmitting apparatus only when actual communication is in progress or when measurements are being taken. At all other times, such as when the spark is being tested or sending is being practised the aerial must be disconnected.

17. When the licensed station is in the vicinity of a commercial station it should be connected with the local telephone exchange so that instant communication may be established in case of interference.

18. *Amateur Experimental Licences.*—Amateur experimental licences will be granted to small stations used for instruction, experi-

mental purposes, or amusement by persons relatively inexperienced in operating.

In addition to the provisions contained in the regular form of amateur experimental licence annexed hereto (Form No. W. 44), the following special regulations will apply to all amateur experimental stations.

Special Regulations for Amateur Experimental Stations.

19. At amateur experimental stations the power used measured at the terminals of the transformer must not exceed ½ k.w.

20. The wave-lengths which may be used vary with the distance between the licensed station and any commercial coast or land station or a route of navigation as follows:—

For Transmission—

Class 1.—Station located within 5 miles of a commercial coast or land station or a route of navigation, shall not use a transmitting wave-length greater than 50 metres;

Class 2.—Stations located more than 5 but less than 25 miles from a commercial coast or land station or a route of navigation, shall not use a transmitting wave-length greater than 100 metres;

Class 3.—Stations located more than 25 but less than 75 miles from a commercial coast or land station or route of navigation, shall not use a transmitting wave-length greater than 150 metres;

Class 4.—Station located more than 75 miles from a commercial coast or land station or route of navigation, shall not use a transmitting wave-length greater than 230 metres.

21. In cases where transmitting apparatus is installed the natural wave-length of the aerial and the length of the emitted waves must be as specified in the licence; in general this wave-length will be the maximum allowable under Regulation No. 20.

22. In cases where no transmitting apparatus is installed on the station, no limit is placed on the length of the aerial which may be used provided it is employed for the purpose of reception only.

23. The station must be worked by a person holding an amateur experimental certificate of proficiency (see Regulation No. 97).

24. The waves emitted must be as little damped as possible, and in no case shall the logarithmic decrement of a complete oscillation exceed two-tenths. The coupling between the primary and secondary of the oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits.

25. A distinctive call signal will be allotted to each station commencing with the letter "X," *e.g.*, XAA, XAB, which signal must be sent not less than three times at the termination of every transmission.

26. The regulations of the International Radiotelegraph Convention must, where applicable, be observed by the station.

27. The station must take every precaution to prevent interference with the working of other stations.

28. The station, when operating, must listen for the signal "STP" which will indicate that an amateur experimental station is interfering with commercial business.

29. The latter signal will only be made use of by certain authorised Government stations and will not be used unless absolutely necessary. The signal "STP" will, whenever possible, be preceded by the call signal allotted to the amateur experimental station to which the interference is attributed, and will be followed by the call signal of the Government station. On receipt of the "STP" signal, all amateur experimental stations will cease to operate until the Government station gives the signal "Cancel STP."

30. The aerial must be connected to the transmitting apparatus only when actual communication is in progress or when measurements are being taken. At all other times, such as when the spark is being tested or sending is being practised the aerial must be disconnected.

31. When the licensed station is in the vicinity of a commercial station it should be connected with the local telephone exchange so that instant communication may be established in case of interference.

32. *Technical and Training School Licences.*—Technical and Training school licences will be granted to stations intended for educational purposes; they will be afforded every facility for the work they propose to undertake compatible with any special local conditions such as the existence of a commercial or coast station in their vicinity; in general they will be subject to the same conditions as amateur experimentals and experimental stations.

33. *Ship Station Licences.*—Ship station licences will be granted to stations on British ships registered in Canada.

The regular form of the licence is annexed hereto. (Form No. W. 19.)

Classification of Ship Stations.

34. *Class* 1.—All "sea-going" passenger vessels registered in Canada with an average speed of 15 knots or more, carrying 50 or more persons and plying between ports more than 200 miles apart; also all "sea-going" passenger vessels registered in Canada with an average speed of 13 knots or more, carrying 200 or more persons and plying between ports more than 500 miles apart.

35. *Class 2a.*—All "sea-going" passenger vessels registered in Canada affected by the provisions of Section 4 of the Radiotelegraph Act, which do not come under Class 1.

Class 2b.—All vessels registered in Canada plying on "coasting voyages" or on the "inland waters" of Canada which are affected by the provisions of Section 4 of The Radiotelegraph Act.

36. *Class* 3.—All vessels registered in Canada not affected by the provisions of Section 4 of The Radiotelegraph Act, but which have been voluntarily equipped with radiotelegraph apparatus.

The terms "sea-going," "coasting," "voyage," and "inland waters" are to be as defined in Section 72 of The Canada Shipping Act, Chapter 113, R.S., 1906.

Regular Equipment.

37. *Vessels in Class* 1.—The regular radiotelegraph equipment must have a minimum range of 100 nautical miles at all hours of the day and night with a similar equipment on a similar vessel and with all Canadian Government coast stations.

38. The normal wave-length of the emitted wave must be 600 metres; in addition the set must be capable of being operated on a wave-length of 300 metres, and means are to

be provided whereby a quick change-over from one wave-length to the other may be effected.

39. In the case of small vessels on which it is materially impossible to use a transmitting wave-length of 600 metres, 300 metres may be employed; such ship stations, however, must be fitted with a receiver capable of tuning up to a 600 metre wave-length and the watches must be maintained on that wave-length.

40. The logarithmic decrement of a complete oscillation must not exceed two-tenths (0·2).

41. The power used by the transmitter, measured at the terminals of the generator of the station, must not, under normal circumstances, exceed 1 k.w., except in the special case provided for in article 35, paragraph 2, of the International Radiotelegraph Convention of London, 1912.

42. In the case of equipments using power of more than 50 watts, an arrangement must be provided whereby several ranges, each less than the normal range, may be speedily obtained, the shortest range being, approximately, 15 nautical miles.

43. The use of "plain aerial" except in cases of distress or in installations using a power of less than 50 watts, is prohibited.

44. *Vessels in Class* 2.—Regulations No. 37 to No. 43, inclusive, shall apply to the equipments on vessels in Classes 2a and 2b.

45. *Vessels in Class* 3.—Regulations No. 38 to No. 43, inclusive, shall apply to equipments on vessels in Class 3.

Emergency Equipments.

46. *Class* 1.—Every vessel in Class 1 must carry an emergency source of power, instantly available, which shall be capable of operating the equipment for six hours, under normal conditions, with a minimum range of 80 nautical miles.

47. *Class* 2.—Vessels in Classes 2a and 2b must carry a similar source of power with the exception that the minimum normal range of the equipment is reduced to 50 nautical miles.

48. *Class* 3.—Vessels in Class 3 will not be required to carry emergency sets.

49. *Emergency Equipments Generally.*—(1) The emergency equipment in its entirety, must in all cases be placed in the upper part of the ship, as high as practicably possible and in a position of the greatest safety.

(2) The emergency equipment may take the form of complete transmitter. Storage battery sets, of sufficient capacity to operate the regular radiotelegraph equipment of the vessel for the specified time, are, however, strongly recommended.

(3) A plain aerial transmitter may be installed as an emergency equipment, provided (subject to the provisions of Regulation No. 43) the use of the same is confined exclusively to distress calls.

(4) Regulations No. 46 to No. 49, inclusive, will become effective on and after December 1st, 1914.

50. *Spare Parts.*—Every ship station shall carry a reasonable number of spares of such parts of both the main and emergency radiotelegraph equipment as are subject to undue wear, deterioration, or liability to accident.

51. *Certificate of Inspection.*—The radiotelegraph installation on all British vessels registered in Canada will be subject to inspection by an officer of the Department of the Naval Service at least once a year, who, if the apparatus is found to comply with the terms of The Radiotelegraph Act and the regulations issued thereunder, shall issue to the vessel a "Radiotelegraph Inspection Certificate" certifying that the equipment has been duly inspected and that it complies with the provisions of the licence issued therefore by the Minister of the Naval Service, such certificate to be posted in the radiotelegraph cabin.

52. *Time.* — Radiotelegraph stations on vessels plying on the West Coast shall observe Pacific time, and those on the Great Lakes and East Coast Eastern Standard time.

Watches.

53. *Vessels in Class* 1.—A constant watch must be maintained at the radiotelegraph stations on all vessels in Class 1 (Regulation No. 34) whilst they are en route, and two operators, holding first-class certificates, must be carried on such vessels.

54. *Vessels in Class 2a.*—A constant watch from 8 a.m. to 3 p.m. and a watch during the first ten minutes of every other hour of the day must be maintained at the radiotelegraph stations on all vessels in Class 2*a* (Regulation No. 35) whilst they are en route; the ten minute watch may be maintained by an operator holding a "Second-class Certificate of Proficiency," or by a person holding a regular "Third-class Certificate."

55. *Vessels in Class 2b.*—Watches as hereinafter specified in Regulations No. 57 to No. 67, must be maintained at the radiotelegraph stations on all vessels in Class 2b, whilst they are en route.

56. *Vessels in Class* 3.—No fixed watches need be maintained at radiotelegraph stations on vessels in Class 3 (Regulation No. 36).

Pacific Coast.

57. *Class 2b—Local Coasting Runs.*—Vessels in Class 2b, when plying on ferry or local runs between any ports in British Columbia south of Queen Charlotte Sound or between any ports in the above province north of that Sound and not steaming for more than 16 hours in any day, must, whilst en route, maintain watches during the following periods :—

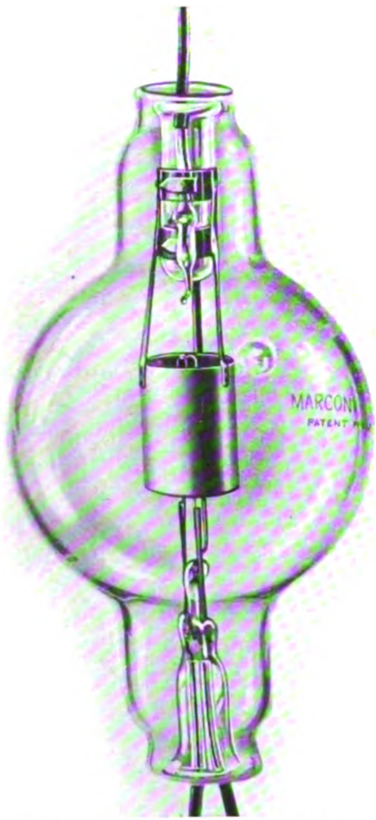
7.30 a.m. to 8.00 a.m. and the last half hour of every hour until 8.00 p.m.
9.30 p.m. to 10.00 p.m.
11.30 p.m. to 12.00 midnight.
3.30 a.m. to 4.00 a.m.
5.30 a.m. to 6.00 a.m.

In the case of vessels affected by Subsection (c) of Section 4 of The Radiotelegraph Act (500 persons—ports more than 20 miles apart), the above watches need only be kept whilst the boats are en route between ports more than 20 miles apart.

58. Vessels in Class 2b, when plying on ferry or local runs between any ports in British Columbia south of Queen Charlotte Sound or between any ports in the above province north of that Sound and steaming for more than 16 hours in any one day, must, whilst en route, maintain watches as prescribed in Regulation No. 57, with the exception that a watch may be maintained from 1.30 a.m. to 2.00 a.m. instead of from 3.30 a.m. to 4.00 a.m., and no watch need be kept between the hours of 2.00 a.m. and 9.30 a.m.

59. *Class 2b—Coasting Vessels Plying North and South.*—Vessels in Class 2b plying on runs between ports in British Columbia south of Queen Charlotte Sound and ports in the same province north of that Sound, or vice versa, must, whilst en route, maintain watches during the following periods :—

7.30 a.m. to 8.00 a.m.



MARCONI TWO-ELECTRODE RECTIFYING VALVE, TYPE M.R.I.

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10.30 a.m. to 11.00 a.m.
1.30 p.m. to 2.00 p.m.
4.30 p.m. to 5.00 p.m.
7.30 p.m. to 8.00 p.m.
10.30 p.m. to 11.00 p.m.

If, during these periods, the vessel is in the immediate vicinity of any place mentioned in the lists given in Regulations 60 and 61, communication must be established with the coast station shown, or should the vessel reach such vicinity out of the above periods the ship station must call such coast station until communication is established or it becomes out of range.

60. *North Bound* :—

Station.	Locality.	
	Day Time. Between 7.30 a.m. and 11 p.m.	Night Time. Between 11 p.m. and 7.30 a.m.
Gonzales Hill	Trial Island	Trial Island.
Point Grey	The First Narrows or Abeam Porlier Pass	The First Narrows or Abeam Porlier Pass.
Cape Lazo	Abeam	
"	Cape Mudge	Cape Mudge.
Alert Bay	Blinkensop Bay	
"	Abeam	Abeam.
"	Pine Island	Pine Island.
Triangle Island	"	"
"	Egg Island	Egg Island.
"	Before reaching Harold Point ..	Before reaching Harold Point.
"	Ivory Island	Ivory Island.
"	Vancouver Rock	
Digby Island	Watson Rock	Watson Rock.
"	Abeam	Abeam.
"	"	"
"	Hodgson Island	
"	Pointers	Pointers.

61. *South Bound* :—

Station.	Locality.	
	Day Time. Between 7.30 a.m. and 11 p.m.	Night Time. Between 11 p.m. and 7.30 a.m.
Digby Island	Pointers	Pointers.
"	Hodgson Island	
"	Abeam	Abeam.
"	"	"
"	Lawyer Island	Lawyer Island.
Triangle Island	Vancouver Rock	Vancouver Rock.
"	Ivory Island	
"	Harold Point	Harold Point.
"	Egg Island	Egg Island.
"	Pine Island	Pine Island.
Alert Bay	"	"
"	Abeam	
"	Blinkensop Bay	Blinkensop Bay
Cape Lazo	Chatham Point	
"	Abeam	Abeam.
Point Grey	Sisters	Sisters.
"	Abeam	Abeam.
Gonzales Hill	Active Pass	Active Pass.

GREAT LAKES AND EAST COAST.

62. *Class 2b.—Vessels Plying on the Great Lakes and on Coasting Voyages on the East Coast.*—Vessels in Class 2b plying on voyages of more than 300 miles between terminal ports on the Great Lakes or East Coast must maintain watches whilst en route as follows :—

7.00 a.m. to 7.30 a.m.
10.00 a.m. to 10.30 a.m.
1.00 p.m. to 1.30 p.m
4.00 p.m. to 4.30 p.m.
7.00 p.m. to 7.30 p.m.
10.00 p.m. to 10.30 p.m.

Communication must also be established with each coast station when abeam, irrespective of whether such position is reached during the above periods or not.

63. Vessels in Class 2b, plying on voyages of less than 300 miles but more than 50 miles between terminal ports and not steaming for

more than 16 hours out of the 24, must maintain watches whilst en route as follows :—

8.00 a.m. to 8.30 a.m. and the first half-hour of every hour until 8.30 p.m.
10.00 p.m. to 10.30 p.m.
12.00 p.m. to 12.30 a.m.
4.00 a.m. to 4.30 a.m.
6.00 a.m. to 6.30 a.m.

64. Vessels in Class 2b, plying on voyages of less than 300 miles but more than 50 miles between ports and steaming for more than 16 hours in any one day, must, whilst en route, maintain watches as prescribed in Regulation No. 63, with the exception that 2.00 a.m. to 2.30 a.m. is substituted for 4.00 a.m. to 4.30 a.m., and no watch need be kept between the hours of 2.30 a.m. and 10.00 a.m.

66. Vessels in Class 2b plying on voyages of less than 50 miles between terminal ports and not steaming more than 10 hours out of the 24 must, whilst en route, maintain a constant watch.

67. Vessels in Class 2b plying on voyages of less than 50 miles between terminal ports and steaming for more than 10 hours in the 24 must, whilst en route, maintain watches as prescribed in Regulation No. 64.

OPERATION.

68. *Power Available.*—Power for the operation of the main equipment shall be available during the periods a watch is being maintained under Regulations No. 53 to No. 67.

69. *Control of Ship Stations.*—The operation of the radiotelegraph station on any vessel shall be under the supreme control of the master of such vessel.

70. *Censorship by the Master of a Vessel.*—The master of a vessel shall have the right to censor all messages addressed to or transmitted by a radiotelegraph station on board his vessel, but such master shall not divulge to any person (other than the properly authorised officials of the Government or a competent legal tribunal), or make any use whatever of any message coming to his knowledge through the exercise of such censorship, nor shall the master or any operator divulge to any person (other than the properly authorised officials of the Government or a competent legal tribunal), or make any use whatever of any message (other than a message of distress) coming to his knowledge and not intended for the said station.

71. *Form W.* 40.—A copy of Form W. 40 must be posted in every radiotelegraph station ; these forms may be obtained from the Deputy Minister of the Naval Service on request.

72. *Secrecy of Messages.*—No message shall be delivered, or its contents divulged, to any person except the addressee, his or her accredited agent, or such properly authorised persons as are essential for the forwarding of such message to its destination.

73. *Superfluous Signals.*—The transmission of superfluous signals by any ship or coast station is absolutely prohibited ; trials and practices are forbidden except under such circumstances as to preclude the possibility of interference with other stations.

74. *Profane Language.*—No person shall transmit or make a signal containing profane words or language.

OPERATORS.

75. *Operators.*—Except in cases of emergency or distress the apparatus of all coast, land or ship stations must only be worked by persons holding regular Certificates of Proficiency in Radiotelegraphy, and who have subscribed to a Declaration of Secrecy, as prescribed in Section 6 of the Radiotelegraph Act.

76. *British Subjects.*—All operators on coast, ship or land stations must (subject to the provisions of Regulation No. 88*b*) be British subjects, and the different classes of stations must be worked by operators holding Canadian "Certificates of Proficiency" (subject to the provisions of Section 77) not inferior to those hereinafter specified in Regulations No. 80 to No. 86, for the respective classes of stations.

77. *Ship Stations.*—The holders of Certificates of Proficiency in Radiotelegraphy issued in accordance with the provisions of the International Radiotelegraph Convention by His Majesty's Postmaster-General, the Administration of any British self-governing Dominion or Colony, or the Government of India, will (subject to the provisions of these regulations) be entitled to act as radiotelegraph operators on any Canadian vessels.

78. *Certificates of Proficiency.*—The following Certificates of Proficiency in Radiotelegraphy are issued by the Department :—

Ship Stations—
(1) First-class Certificate.
(2) Second-class Certificate.
(3) Third-class (Watcher's) Certificate.

Land and Coast Stations—
(4) Extra First-class Certificate.
(5) First-class Certificate.
(6) Second-class Certificate.
(7) Third-class (Watcher's) Certificate.
(8) Experimental Certificate.
(9) Amateur Experimental Certificate.

79. *Emergency Certificates.*—In cases of emergency, when it is not possible to hold an examination, the Minister shall have power to issue "Emergency Certificates" of any class, valid for not more than six months, provided satisfactory proof is forthcoming that the operator has the necessary qualifications for the position.

The holders of such Emergency Certificates must attend a regular examination, when the first opportunity occurs, and the said certificate will automatically expire on the day on which the result of such examination is published.

OPERATORS TO BE CARRIED.

80. *Ships in Class* 1.—Ships in Class 1 must carry two operators holding First-class Certificates.

81. *Ships in Class 2a.*—Ships in Class 2a must carry two operators, one First-class and one Second-class, or one First-class and one Third-class.

82. *Ships in Class 2b.*—Ships in Class 2b must carry one First-class operator.

83. *Ships in Class* 3.—Ships in Class 3, if they undertake public correspondence, must carry one First-class operator or, if their service is limited exclusively to the ship's business, one Second-class operator.

84. *Coast Stations.*—(1) All public coast stations open for public correspondence and maintaining a constant watch must carry three operators, each of whom must hold a Canadian First-class Certificate of Proficiency. The Minister shall, however, have power in special cases to permit the employment of other persons on such stations for the purpose of maintaining the constant watch above mentioned, provided such persons are capable of transmitting and receiving in the Morse

Code at a speed of twenty words a minute as prescribed in subsections (*a*) and (*b*) of Regulation No. 89 and provided the station is in charge of an operator holding a First-class Certificate of Proficiency.

(2) This regulation will become effective on and after the 1st of January, 1915.

85. All other coast stations shall carry such operators holding such certificates as are specified in the licence issued for the station under Regulation No. 4.

86. *Land Stations.*—Land stations (commercial, experimental, etc.) shall carry such operators holding such certificates as are specified in the licence issued for the station under Regulations Nos. 5, 6, 7, 18 or 32, according to the classification of the station.

87. *Applications.*—Applications for permission to attend examinations for any certificate of proficiency must be made to the Deputy Minister of the Naval Service on the special form provided for that purpose (W. 13). The date and place of examination will be notified to the candidate as soon as possible after receipt of the application.

88.* (*a*) No person shall be permitted to attend examination for any class of certificate of proficiency in radiotelegraphy

(i.) who is not a natural born British subject;

(ii.) who has at any time been of enemy nationality;

(iii.) whose parents or either of them have at any time been of enemy nationality.

Provided, however, that any naturalised British subject who has not or whose parents or either of them have not at any time been of enemy nationality may be admitted to examination if his application be approved by the Minister of the Naval Service.

(*b*) Candidates for examination for first-class certificates of proficiency must be not less than eighteen years of age.

(*c*) For the purposes of this regulation a person shall be deemed to be of enemy nationality if he has at any time been a subject of a state with which Great Britain has been at war within the period of ten years immediately preceding the date of this regulation.

Ship Stations.

89. *First-Class Certificate.*—Candidates for first-class certificates will be examined in the following subjects:

(1) Transmission and reception at a speed of twenty words a minute;

(2) Adjustment, care and operation of apparatus;

(3) The regulations applicable to the exchange of radiotelegraph traffic.

The examination will consist of two sections "Practical" and "Written":—

"*Practical*" *Section.*

(*a*) To send on an ordinary radiotelegraph key for five consecutive minutes at not less than the prescribed speed (viz., twenty words a minute, five letters being counted as one word); the accuracy of signalling, the correct formation of the letters, and the correctness of spacing will be taken into account.

(*b*) To receive and write legibly for not less than five consecutive minutes at the prescribed speed from signals received on a double headgear telephone receiver as ordinarily used for radiotelegraph reception.

* As amended October 15th, 1919.

(*c*) To connect up the apparatus with the help of a diagram of connections.

(*d*) To name the principal parts of the apparatus.

(*e*) To mention the most common faults which develop in the apparatus of the set in which he is being examined and the means usually taken to remedy them.

(*f*) To trace, locate, and remedy several such faults.

(*g*) To adjust the apparatus after it has been placed out of adjustment.

(*h*) To change the wave-length of the transmitter from 300 to 600 metres and vice versa.

(*i*) To reduce or increase the transmitting power.

"*Written*" *Section.*

(*j*) To complete a diagram of connections of the set in which the candidate is being examined.

(*k*) To answer seven technical questions on the equipment, including storage battery and emergency set, if any.

(*l*) To answer nine questions on the methods of handling radiotelegraph messages and the regulations applicable to the exchange of radiotelegraph traffic and communications as set out in the latest edition of the British Postmaster-General's Handbook and the service regulations annexed to the International Radiotelegraph Convention in force; the questions will also include the counting, checking and computation of tolls on three test messages. The candidate will also be required to have a thorough knowledge of the use of the "C.P.R.," "Western Union," and "G.N.W." tariff books and the "Official List of Radiotelegraph Stations" issued by the International Telegraph Bureau. Given these books, he will be required to compute the charges on a test message from any ship via any Canadian coast station to any telegraph office in the world.

90. *Second-Class Certificate.*—Candidates for second-class certificates must pass a satisfactory examination on all the subjects prescribed for the first-class, with the exception that the minimum speed of transmission and reception is reduced to twelve words a minute. Holders of this certificate will only be allowed to operate stations on ships in Classes 2a and 2b, as specified in Regulations Nos. 81 and 83.

91. *Third-Class Certificate.* — Third-class (Watcher's) certificate will authorise the holder to work at one station only, the name and call signal of which will be designated in the certificate.

The examination will be practical and *viva voce* and the candidate will be required:—

(1) To distinguish from other signals the call signal of the station designated in the certificate, when it is repeated several times, at the rate of ten words a minute;

(2) To distinguish from other signals the distress call "SOS" when it is repeated several times, at the rate of ten words a minute;

(3) To adjust the receiver for incoming signals on the wave-length normally used;

(4) To test the detector with a buzzer or other testing appliances and to adjust it for the efficient reception of signals on the normal wave-length.

Coast and Land Stations.

92. *Extra First-Class Certificate.*—Candidates for Extra First-Class Certificates, in addition

to taking a thorough examination on the subjects set out in sections (*c*) to (*l*) of Regulation No. 89, will be required :—

"*Practical*" *Section.*

(*a*) To send and receive in the International Morse Code for five minutes at a speed of not less than twenty-five words a minute, under the conditions prescribed in sections (*a*) and (*b*) of Regulation No. 89;

(*b*) To trace, locate and remedy faults in a radiotelegraph installation, of not less than five kilowatt power, including a gasoline engine and an induction motor;

(*c*) With the use of a wavemeter, to measure the wave-length of a given circuit, the coefficient of coupling between the two circuits of an oscillation transformer, and to adjust a receiver for the reception of waves of a given length.

"*Written*" *Section.*

(*d*) To answer seven questions on the principles governing the working of radiotelegraph installations, internal combustion engines and dynamo electric machinery, as used in connection with radiotelegraph installations;

(*e*) To answer three questions on the organisation of a radiotelegraph service, including the procedure followed in connection with transfer of business to and from land lines and the handling of accounts.

The holder of an extra first-class certificate will be authorised to operate on any Canadian coast, land or ship station.

93. *First-Class Certificate.*—The examination for the first-class coast certificate will be similar in all respects to that for the first-class ship station certificate, with the exception that the candidate will be required to have a knowledge of the care and operation of gasoline engines.

94. *Second-Class Certificate.*—The examination for the second-class coast certificate will be similar to that for the first-class, with the exception that the minimum speed of transmission and reception is reduced to twelve words a minute.

95. *Third-Class Certificate.*—The examination for the third-class coast certificate will be similar to that for the third-class ship certificate.

96. *Experimental Certificate.*—Candidates for an experimental certificate will be required :

"*Practical*" *Section.*

(*a*) To send on an ordinary radiotelegraph key for five consecutive minutes at a speed of not less than twelve words a minute, five letters being counted as one word; the accuracy of signalling, the correct formation of the letters, and the correctness of spacing will be taken into account;

(*b*) To receive and write legibly for not less than five consecutive minutes at a speed of not less than twelve words a minute, five letters being counted as one word, from signals received on a double headgear telephone receiver as ordinarily used for radiotelegraphic reception, and to distinguish the signals "SOS," "STP," and his own call signal from among other signals, when sent at a speed of twenty words a minute;

(*c*) To reduce the transmitting power;

(*d*) To change the wave-length of the transmitter within the limits prescribed in the licence issued for the station;

(*e*) To adjust the apparatus after it has been placed out of adjustment.

"*Written*" *Section.*

(*f*) To complete a diagram of connections of the set in which the candidate is being examined;

(*g*) To answer seven technical questions on the equipment, including storage battery and emergency set, if any;

(*h*) To answer nine questions on the procedure governing the handling of radiotelegraph messages and the regulations applicable to the exchange of radiotelegraph traffic and communications, particularly as set out in part 5, sections 60 to 91 of the Postmaster-General's Handbook for Wireless Telegraph Operators, section 6, articles 20 to 35 of the regulations annexed to the International Radiotelegraph Convention, and the Minister's Regulations applicable to the operation of experimental stations.

97. *Amateur Experimental Certificate.*—Candidates for an amateur certificate will be examined in the adjustment and operation of the apparatus they propose to operate and will be required to have a satisfactory knowledge of the departmental regulations governing the working of amateur experimental stations (Regulations No. 19 to No. 31), and those annexed to the International Radiotelegraph Convention of London, applicable to the working of stations generally, particularly section 6, articles 20 to 35, entitled "Transmission of Radiotelegrams."

The examination will be practical and *viva voce*, and the candidates will be required to send and receive in the International Morse Code at a speed of not less than five words a minute and to distinguish from other signals the signals "SOS," "STP," and the call signal of his station when repeated several times at a speed of ten words a minute.

EXAMINATIONS GENERALLY.

98. *Places at which Examinations will be held.*—Examinations will generally be conducted at the Department of the Naval Service, Ottawa; special arrangements will, however, be made where circumstances permit for holding an examination at any radiotelegraph station or any technical school of telegraphy at which suitable apparatus is provided for the purpose.

99. The certificates of proficiency will indicate the system or systems of radiotelegraphy under which the candidate's examination was conducted.

100. *Failure to Pass.*—In case of failure a candidate will not ordinarily be re-examined until after the lapse of three months. An additional fee will be payable in respect of the further examination.

101. *Suspension of Certificate.*—Should it be proved to the satisfaction of the Minister that the holder of a "Certificate of Proficiency" has wilfully or negligently failed to comply with the provisions of the International Radiotelegraph Convention and Regulations, or of these regulations, or of any other regulations which may be issued from time to time for his guidance, the certificate may, at the discretion of the Minister, be suspended or cancelled.

102. *Inspection of Stations.*—Any duly authorised officer of the department may, from time to time, and at all reasonable times, enter upon any coast, land or ship station, within the jurisdiction of Canada, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station,

for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such station, also the working and user of such apparatus and telegraphic instruments, and all books and papers used in connection with the operation of such station. His authority will be in the form of a letter signed by the Deputy Minister of the Department of the Naval Service.

103.* *Ship Stations in Territorial Waters.*—The Radiotelegraph Stations on board ships (other than H.M. ships of war or Canadian Government vessels) shall not be worked while such ships are within the Territorial Waters of Canada, unless specific permission is granted therefor by the controlling Canadian coast stations for the locality, and then only provided such working does not interfere with the operation of any coast station established in Canada, and that the provisions of the Radiotelegraph Convention of London, 1912, and the Service Regulations annexed thereto are strictly observed.

104.† *Ship Stations in Harbours.*—(*a*) The Radiotelegraph Stations on board ships (other than H.M. ships of war or Canadian Government vessels) *shall not be worked whilst such ships are within a harbour of the Dominion of Canada.*

(*b*) For the proper enforcement of the above, *ships of British register in Canadian harbours must completely disconnect their aerial wires from their radio apparatus,* the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, *in such a manner as to show they are properly disconnected.*

(*c*) *Ships of foreign register* in a Canadian harbour *must* (subject to the provisions of the following subsection *d*) *take down their aerial wires completely* and disconnect the same from their radiotelegraph apparatus.

(*d*) Ships of foreign register remaining in a Canadian harbour for *less than thirty-six hours may, at the discretion of the competent naval authority,* be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of subsection (*b*) of this regulation.

(*e*) Subsections (*b*), (*c*), and (*d*) of this regulation, relative to the disconnection of aerials in ships lying in Canadian harbours, will not, until further notice, apply to Canadian or British vessels in Canadian harbours on the Great Lakes. Such vessels must, nevertheless, strictly observe the provisions of subsection (*a*).

105. *Penalty.*—Any person who violates any of the provisions of these regulations shall be liable on summary conviction to a penalty not exceeding fifty dollars and costs or three months' imprisonment.

106.‡ *Wave-length to be used by Ship Stations.*—All Canadian licensed ship stations shall use the wave-length of 600 metres exclusively during the period of hostilities.

W. 42.

LIMITED COAST STATION LICENCE.

D The herein named.................. resident of .... hereinafter called the Licensee, is hereby licensed to establish and operate a radiotelegraph coast station situated at .... for the term of one year commencing on the first day of April 19.... and terminating on the thirty-first day of March 19...., and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of ten dollars ($10), being the licence fee for the privilege above named.

This licence is subject to the Act and Regulations above referred to and to the following terms, conditions and restrictions:—

1. In this licence the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (i.) The licensee shall not establish, install, or work any apparatus for radiotelegraphy, except the apparatus hereinafter called "the licensed apparatus," specified in the said schedule hereto, nor use wave-lengths other than those specified therein.

(ii.) The use of the licensed apparatus shall, except in cases of distress, be limited to the exchange of messages with such stations, vessels or lines of vessels as are specified in the schedule.

(iii.) No tolls, fees or other consideration shall be received, levied, or collected by the licensee until the same have been approved of by the Board of Railway Commissioners for Canada, and in no case shall they exceed those fixed by the International Radiotelegraph Convention of London, 1912.

3. (i.) The licensee shall so work the licensed apparatus as not to interfere with the working of any radiotelegraph station established in Canada or the territorial waters abutting on the coasts of Canada (whether on shore or on any ship), by or for the purposes of the Minister or any Department of His Majesty's Government or for commercial purposes and in particular with the sending or receipt of any messages between or at radiotelegraph stations established as aforesaid on land and radiotelegraph stations established on ships at sea.

(ii.) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees:

(*a*) With respect to all arrangements to be adopted for the purposes of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other radiotelegraph station;

(*b*) With respect to any alternation of messages which the Minister may think necessary.

(*c*) Generally with respect to avoiding interference between one radiotelegraph station and another.

4. The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

5. (i.) The coupling between the primary and secondary circuits of the oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits.

(ii.) The logarithmic decrement per whole period, of the emitted waves, shall not exceed two-tenths except when sending distress calls or messages relating to vessels in distress.

6. The licensee shall install the apparatus at the station mentioned in the schedule, and the said station shall be placed in operation

* As amended August 15th, 1914.
† As amended March 19th, 1917.
‡ Specially issued in Supplementary Circular dated January 20th, 1915

within............ months from the date of this licence, and shall be kept in operation continuously during the hours specified in the schedule, until this licence shall expire.

7. All apparatus used or intended to be used by the licensee shall be so erected, fixed, placed and used as not, either directly or by reason of the working or user thereof, to interfere with the efficient or convenient maintenance, working or user of any telegraphic line.

8. The licensee shall, if so required in writing by the Minister, cease to use the licensed apparatus for such period (not exceeding...... hours in any one day) as may be specified by the Minister.

9. The Minister or his authorised officers may, from time to time and at all reasonable times, enter upon the herein licensed station, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station, for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

10. Subject to the provisions of this licence, the licensee shall transmit and receive messages by means of the licensed apparatus to and from any other station or to and from any ship without regard to the particular system of radiotelegraphy installed at such other station or on such other ship, on equal terms without favour or preference, whether as regards rates of charge, order of transmission or otherwise.

11. (i.) If and whenever any Department of the Government shall require the licensee, his servants or agents to transmit, by means of the licensed apparatus, any message on His Majesty's Service (including messages to and from ships of His Majesty's Royal Navy or Canadian Government vessels), such messages shall have priority over all other messages (except messages of distress) and the licensee, his servants and agents shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof, suspend transmission of all other messages.

(ii.) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

12. The licensee shall, so far as possible, receive from all ships and light stations all requests for assistance and all signals of distress and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in his power.

13. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and not intended for receipt by means of the licensed apparatus, nor shall he divulge to any person other than the addressee or his accredited agent the contents of any message coming to his knowledge intended for receipt by means of the licensed apparatus. The licensee shall exhibit at the said station a copy of Form No. W. 40 issued by the Department of the Naval Service.

14. All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and ultimate destination and such further particulars as the Minister shall, from time to time, reasonably require to be shown, messages on His Majesty's Service being distinguished in such registers from other messages. The licensee shall preserve all used message forms written and printed, and transcripts of messages and all other papers for such period as is from time to time prescribed by the Regulations of the International Radiotelegraph Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the office of the licensee, in................between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a public holiday.

15. The licensee shall make a monthly return to the Minister of all the messages handled by the licensed apparatus and in addition shall render to the Minister such accounts as the Minister shall direct in respect of all charges due or payable under the International Radiotelegraph Convention, in respect of ship-and-coast messages and shall pay to the Minister at such times and in such manner as the Minister shall direct all sums which shall be due from the licensee under such accounts.

16. All operators and other employees of the licensee at the said coast station shall be British subjects, and must be of such number and hold such Certificates of Proficiency as are specified in the schedule annexed hereto.

17. The licensee shall observe at the said station the provisions of the "Radiotelegraph Act" and those of the International Radiotelegraph Convention of London, 1912, and the detailed regulations from time to time made under each or either of them for carrying such provisions into effect.

18. The licensee shall at all times indemnify the Minister against all actions, claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

19. Except with the consent in writing of the Minister, the licensee shall not assign or sublet this licence.

20. In case of any breach, non-observance or non-performance by or on the part of the licensee his servants or agents of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed, then and in any such case the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted and thereupon these presents and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

21. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of radiotelegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of radiotelegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada,

by means of radiotelegraphy, with or to any person or persons whomsoever upon such terms as he shall, in his discretion, think fit.

22. Any notice, request or consent (whether expressed to be in writing or not), to be given by the Minister, under these presents, may be under the hand of any authorised officer, for the time being, of the Department of the Naval Service and may be served by registered post letter to the......................
office of the licensee and any notice to be given by the licensee, under these presents, may be served by sending the same by registered post letter addressed to the Deputy Minister of the Naval Service, Ottawa.

E W. 18.
PUBLIC COMMERCIAL LICENCE.

The herein named......................
resident of..............................
hereinafter called the Licensee, is hereby licensed to establish and operate a Radiotelegraph land station situated at..........
..............for the term of one year commencing on the first day of April ...... and terminating on the thirty-first day of March........, and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of Fifty Dollars ($50), being the licence fee for the privilege above named.

This licence is subject to the said Act and Regulations and to the following terms, conditions and restrictions:—

1. In this licence, the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something, either in the subject or context, repugnant to such construction—that is to say:—

The expression "marine signalling" means signalling by means of any system of radiotelegraphy between two or more ships, between ships and any coast station, or between two Government coast stations; and the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. The licensee shall not establish, install, or work any apparatus for radiotelegraphy, except the apparatus hereinafter called "the licensed apparatus," specified in the said schedule hereto, nor shall wave-lengths other than those mentioned therein be employed.

3. The working of the licensed station shall be limited to the exchange of messages with such coast and land stations as are specified in the schedule.

4. No tolls, fees or other consideration shall be received, levied, or collected by the licensee until the same have been approved of by the Board of Railway Commissioners for Canada.

5. (i.) The licensee shall so work the licensed apparatus as not to interfere with the working of any radiotelegraph station established in Canada by any Department of His Majesty's Government, or with marine signalling on the waters or territory of Canada or neighbouring waters or territory.

(ii.) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees:

(*a*) With respect to all arrangements to be adopted for the purpose of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other radiotelegraph station;

(*b*) With respect to any alternation of messages which the Minister may think necessary; and

(*c*) Generally with respect to avoiding interference between one radiotelegraph station and another.

6. The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

7. The licensee shall, if so required in writing by the Minister, cease to use the licensed apparatus for such period (not exceeding .... hours in any one day) as may be specified by the Minister.

8. The licensee shall at all times indemnify the Minister against all actions, claims, and demands which may be brought or made by any corporation, company, or person in respect of any injury arising from any act licensed or permitted by these presents.

9. (i.) If the maximum power taken by the transmitter as mentioned in the schedule is less than 5 kw. then the coupling between the primary and secondary circuits of the transmitting oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits and the logarithmic decrement of the emitted waves per whole period, shall not exceed two-tenths.

(ii.) In the case of stations using more than 5 kw. power the logarithmic decrement of the emitted waves per whole period shall be as specified by the Minister and as mentioned in the schedule.

10 (i.) If and whenever any Department of the Government shall require the licensee, his servants or agents to transmit, by means of he licensed apparatus, any message on His Majesty's Service, such messages shall have priority over all other messages and the licensee, his servants and agents, shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof suspend transmission of all other messages.

(ii.) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

11. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and not intended for receipt by means of the licensed apparatus nor shall he divulge to any person other than the addressee or his accredited agent the contents of any message coming to his knowledge intended for receipt by means of the licensed apparatus. The licensee shall exhibit at the said station a copy of Form No. W. 40, issued by the Department of the Naval Service.

12. (i.) All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and ultimate destination and such further particulars as the Minister shall from time to time, reasonably require to be shown, messages on His

Majesty's Service being in such registers distinguished from other messages. The licensee shall preserve all used message forms written and printed and transcripts of messages and all other papers for such period as is from time to time prescribed by the Regulations of the International Radiotelegraph Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the office of the licensee, in................ between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a public holiday.

(ii.) The licensee shall make a detailed return of the messages handled by the licensed station during each month on the forms provided for that purpose, and shall forward the same to the Minister at the end of each month.

13. The Minister or his authorised officers may, from time to time, and at all reasonable times, enter upon the herein licensed station, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station, for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

14. All apparatus used or intended to be used by the licensee shall be so erected, fixed, placed and used as not, either directly or by reason of the working or user thereof, to interfere with the efficient or convenient maintenance, working or user of any telegraphic line.

15. The licensee shall observe at the said station the provisions of the Radiotelegraph Act and the detailed regulations from time to time made thereunder for carrying such provisions into effect; also such provisions of the International Radiotelegraph Convention of London, 1912, as are applicable to the operation of the station.

16. Except with the consent in writing of the Minister, the licensee shall not assign or sublet this licence.

17. The licensee shall install the apparatus at the station mentioned in the schedule and the said station shall be placed in operation within............months from the date of this licence, and shall be kept in operation during the hours specified in the schedule until this licence shall expire.

18. All operators and other employees of the licensee at the said station shall be British subjects, and must be of such number and the holders of such certificate of proficiency as are specified in the schedule annexed hereto.

19. In case of any breach, non-observance, or non-performance by or on the part of the licensee, his servants or agents, of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed then and in any such case, the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted and thereupon these presents and the said licences, powers and authorities and each and every of them shall absolutely cease, determine, and become void.

20. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of radiotelegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister from time to time, to enter into agreements for or to grant licences relative to the working and user of radiotelegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of radiotelegraphy, with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit.

21. Any notice, request or consent (whether expressed to be in writing or not), to be given by the Minister, under these presents, may be under the hand of any authorised officer, for the time being, of the Department of the Naval Service, and may be served by sending the same by registered post letter to the ....office of the licensee and any notice to be given by the licensee, under these presents, may be served by sending the same by registered post letter addressed to the Deputy Minister of the Naval Service, Ottawa.

W. 43.

F PRIVATE COMMERCIAL LICENCE.

The herein named ....
resident of .... hereinafter called the licensee, is hereby licensed to establish and operate a radiotelegraph land station situated at .... for the term of one year commencing on the first day of April............and terminating on the thirty-first day of March............, and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of ten dollars ($10), being the licence fee for the privilege above named.

The licence is subject to the said Act and regulations, and to the following terms, conditions, and restrictions:

1. In this licence, the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something, either in the subject or context, repugnant to such construction—that is to say:

The expression "marine signalling" means signalling by means of any system of radiotelegraphy between two or more ships, between ships and any coast station, or between two Government coast stations; and the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. The licensee shall not establish, install or work any apparatus for radiotelegraphy, except the apparatus hereinafter called "the licensed apparatus" specified in the said schedule hereto, nor shall wave-lengths other than those mentioned therein be employed.

3. The working of the licensed station shall be limited to the exchange of messages with such coast and land stations as are specified in the schedule.

4. The station shall be worked solely for the transmission and reception of messages appertaining to the service or affairs of the licensee and no tolls, fees or other consideration shall be received, levied or collected by the licensee on account of any business or messages handled by the licensed apparatus.

5. (i.) The licensee shall so work the licensed apparatus as not to interfere with the working

of any radiotelegraph station established in Canada by any Department of His Majesty's Government, or with marine signalling on the waters or territory of Canada or neighbouring waters or territory.

(ii.) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees :

(*a*) With respect to all arrangements to be adopted for the purpose of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other radiotelegraph station ;

(*b*) With respect to any alternation of messages which the Minister may think necessary ; and

(*c*) Generally with respect to avoiding interference between one radiotelegraph station and another.

6. The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

7. The licensee shall, if so required in writing by the Minister, cease to use the licensed apparatus for such period (not exceeding .... hours in any one day) as may be specified by the Minister.

8. The licensee shall at all times indemnify the Minister against all actions, claims, and demands which may be brought or made by any corporation, company or person in respect of any injury arising from any act licensed or permitted by these presents.

9. (i.) If the maximum power taken by the transmitter as mentioned in the schedule is less than 5 kw. then the coupling between the primary and secondary circuits of the transmitting oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits and the logarithmic decrement of the emitted waves per whole period shall not exceed two-tenths.

(ii.) In the case of stations using more than 5 kw. power the logarithmic decrement of the emitted waves per whole period shall be as specified by the Minister and as mentioned in the schedule.

10. (i.) If and whenever any department of the Government shall require the licensee, his servants, or agents to transmit, by means of the licensed apparatus, any message on His Majesty's Service, such messages shall have priority over all other messages and the licensee, his servants, and agents, shall, as soon as reasonably may be, transmit the same, and shall until transmission thereof suspend transmission of all other messages.

(ii.) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

11. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and not intended for receipt by means of the licensed apparatus nor shall he divulge to any person other than the addressee or his accredited agent the contents of any message coming to his knowledge intended for receipt by means of the licensed apparatus. The licensee shall exhibit at the said station a copy of Form No. W. 40, issued by the Department of the Naval Service.

12. (i.) All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and ultimate destination and such further particulars as the Minister shall, from time to time, reasonably require to be shown, messages on His Majesty's Service being in such registers distinguished from other messages. The licensee shall preserve all used message forms written and printed, and transcripts of messages and all other papers for such period as is from time to time prescribed by the Regulations of the International Radiotelegraph Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the office of the licensee, in..................... between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a public holiday.

(ii.) The licensee shall make a detailed return of the messages handled by the licensed station during each month on the forms provided for that purpose, and shall forward the same to the Minister at the end of each month.

13. The Minister or his authorised officers may from time to time, and at all reasonable times, enter upon the herein licensed station, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station, for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

14. All apparatus used or intended to be used by the licensee shall be so erected, fixed, placed and used as not, either directly or by reason of the working or user thereof, to interfere with the efficient or convenient maintenance, working or user of any telegraphic line.

15. The licensee shall observe at the said station the provisions of the Radiotelegraph Act and the detailed regulations from time to time made thereunder for carrying such provisions into effect ; also such provisions of the International Radiotelegraph Convention of London, 1912, as are applicable to the operation of the station.

16. Except with the consent in writing of the Minister, the licensee shall not assign or sublet this licence.

17. The licensee shall install the apparatus at the station mentioned in the schedule and the said station shall be placed in operation within................months from the date of this licence, and shall be kept in operation during the hours specified in the schedule until this licence shall expire.

18. All operators and other employees of the licensee at the said station shall be British subjects and must be of such number and the holders of such certificate of proficiency as are specified in the schedule annexed hereto.

19. In case of any breach, non-observance, or non-performance by or on the part of the licensee, his servants or agents, of any of the terms or conditions herein contained, and on the part of the licensee to be observed and performed then and in any such case, the

Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted and thereupon these presents and the said licences powers, and authorities, and each and every of them shall absolutely cease, determine and become void.

20. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain, and work any system or systems of radiotelegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of radiotelegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of radiotelegraphy, with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit.

21. Any notice, request or consent (whether expressed to be in writing or not), to be given by the Minister, under these presents, may be under the hand of any authorised officer, for the time being, of the Department of the Naval Service and may be served by sending the same by registered post letter to the ....office of the licensee and any notice to be given by the licensee, under these presents, may be served by sending the same by registered post letter addressed to the Deputy Minister of the Naval Service, Ottawa.

W. 20.

EXPERIMENTAL LICENCE.

G The herein named................ resident of................ hereinafter called the licensee, is hereby licensed to establish and operate an experimental radiotelegraph station situated at.......... ....for the term of one year commencing on the first day of April, 19...., and terminating on the thirty-first day of March, 19...., and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of five dollars ($5), being the licence fee for the privilege above named.

This licence is subject to the said Act and Regulations and to the following terms, conditions and restrictions :

1. In this licence, the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (i.) The licensee shall not establish, install or operate any apparatus for radiotelegraphy, except the apparatus hereinafter called the "licensed apparatus," specified in the said schedule hereto, nor use wavelengths other than those specified therein.

(ii.) The licensee shall work the licensed apparatus solely for the purpose of conducting experiments in radiotelegraphy and for no other purpose whatever.

3. (i.) The licensee shall so work the licensed apparatus as not to interfere with the working of any radiotelegraph station established in Canada or the territorial waters abutting on the coasts of Canada (whether on shore or on any ship), by or for the purposes of the Minister or any Department of His Majesty's Government or for commercial purposes and in particular with the sending or receipt of any messages between or at radiotelegraph stations established as aforesaid on land and radiotelegraph stations established on ships at sea.

(ii.) With a view to preventing such interference as aforesaid the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees :

(*a*) With respect to all arrangements to be adopted for the purpose of securing syntonised apparatus or for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other radiotelegraph station ;

(*b*) Generally with respect to avoiding interference between one radiotelegraph station and another.

The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

5. (i.) The coupling between the primary and secondary circuits of the oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits.

(ii.) The logarithmic decrement per whole period of the emitted waves shall not exceed two-tenths except when sending distress calls or messages relating to vessels in distress.

6. The licensee shall not divulge to any person (other than the properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and not intended for receipt by means of the licensed apparatus. The licensee shall exhibit at the said station a copy of Form No. W. 40, issued by the Department of the Naval Service.

7. The Minister or his officers may, from time to time and at all reasonable times, enter upon the herein licensed station, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station, for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments respectively.

8. All apparatus used or intended to be used by the licensee shall be so erected, fixed, placed and used as not, either directly or by reason of the working or user thereof, to interfere with the efficient or convenient maintenance, working or user of any telegraphic line.

9. The licensee shall at all times indemnify the Minister against all actions, claims, and demands which may be brought or made by any corporation, company or person in respect of any injury arising from any act licensed or permitted by these presents.

10. The licensed apparatus shall only be worked by a person, or persons, holding certificates as are specified in the schedule annexed hereto.

11. The licensed apparatus shall be operated in accordance with the provisions of the Radiotelegraph Act and the regulations issued thereunder by the Governor in Council or the Minister, and also in accordance with such provisions of the International Radio-

telegraph Convention as are applicable to such operation.

12. Except with the consent in writing of the Minister, the licensee shall not assign or sublet this licence.

13. (i.) The Minister may at any time in his absolute discretion give notice in writing to determine these presents, and the licence or permission hereby given at the end of one calendar month from the date of such notice, and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly, but without prejudice to any remedy of the Minister under any provision herein contained on the part of the licensee to be observed and performed.

(ii.) The licensee shall, if so required by the Minister, cease to use the licensed apparatus for such period (not exceeding eight hours in any one day) as may be specified by the Minister.

14. In case of any breach, non-observance, or non-performance by or on the part of the licensee, his servants or agents of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed, then and in any such case, the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted, and thereupon these presents, and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

15. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of radiotelegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of radiotelegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of radiotelegraphy, with or to any person or persons whomsoever upon such terms as he shall, in his discretion, think fit.

16. Any notice, request or consent (whether expressed to be in writing or not), to be given by the Minister under these presents may be under the hand of any authorised officer, for the time being, of the Department of the Naval Service, and may be served by sending the same by registered post letter to the licensee, and any notice to be given by the licensee, under these presents, may be served by sending the same by registered post letter addressed to the Deputy Minister of the Naval Service, Ottawa.

W 44.
AMATEUR EXPERIMENTAL LICENCE.

HThe herein named.............. resident of .... hereinafter called the licensee, is hereby licensed to establish and operate an experimental radiotelegraph station situated at .... for the term of one year commencing on the first day of April, 19...., and terminating on the thirty-first day of March, 19...., and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of one dollar ($1) being the licence fee for the privilege above named.

This licence is subject to the said Act and regulations and to the following terms, conditions and restrictions :

1. In this licence, the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (i.) The licensee shall not establish, install, or operate any apparatus for radiotelegraphy, except the apparatus hereinafter called the "licensed apparatus" specified in the said schedule hereto, nor use wave-lengths other than those specified therein.

(ii.) The licensee shall work the licensed apparatus solely for the purpose of conducting experiments in radiotelegraphy and for no other purpose whatever.

3. (i.) The licensee shall so work the licensed apparatus as not to interfere with the working of any radiotelegraph station established in Canada or the territorial waters abutting on the coasts of Canada (whether on shore or on any ship), by or for the purposes of the Minister or any Department of His Majesty's Government or for commercial purposes and in particular with the sending or receipt of any messages between or at radiotelegraph stations established as aforesaid on land and radiotelegraph stations established on ships at sea.

(ii.) With a view to preventing such interference as aforesaid the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees :

(*a*) With respect to all arrangements to be adopted for the purpose of securing syntonised apparatus or for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other radiotelegraph station ;

(*b*) Generally with respect to avoiding interference between one radiotelegraph station and another.

4. The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

5. (i.) The coupling between the primary and secondary circuits of the oscillation transformer shall not be closer than that which gives a difference of 5 per cent. between the mean wave-length and either of the two waves emitted by the coupled circuits.

(ii.) The logarithmic decrement per whole period, of the emitted waves, shall not exceed two-tenths.

6. The licensee shall not divulge to any person (other than the properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and not intended for receipt by means of the licensed apparatus. The licensee shall exhibit at the said station a copy of Form No. W. 40, issued by the Department of the Naval Service.

7. The Minister or his officers may, from time to time and at all reasonable times, enter upon the herein licensed station, for the purpose of inspection, and may inspect any apparatus fixed or in use in such station, for the purpose of sending and receiving messages by radiotelegraphy and all other telegraphic instruments and apparatus fixed or being in such stations and the working and user of

such apparatus and telegraphic instruments respectively.

8. All apparatus used or intended to be used by the licensee shall be so erected, fixed, placed, and used as not, either directly or by reason of the working or user thereof, to interfere with the efficient or convenient maintenance, working or user of any telegraphic line.

9. The licensee shall at all times indemnify the Minister against all actions, claims and demands which may be brought or made by any corporation, company or person in respect of any injury arising from any act licensed or permitted by these presents.

10. The licensed apparatus shall only be worked by a person, or persons, holding an amateur experimental certificate of Proficiency in Radiotelegraphy as provided for in Regulation No. 97 of the Minister's Regulations.

11. The licensed apparatus shall be operated in accordance with the provisions of the Radiotelegraph Act and regulations issued thereunder by the Governor in Council or the Minister and in accordance with such provisions of the International Radiotelegraph Convention as are applicable to such operation.

12. Except with the consent in writing of the Minister, the licensee shall not assign or sublet this licence.

13. (i.) The Minister may at any time in his absolute discretion give notice in writing to determine these presents and the licence or permission hereby given at the end of one calendar month from the date of such notice, and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly, but without prejudice to any remedy of the Minister under any provision herein contained on the part of the licensee to be observed and performed.

(ii.) The licensee shall, if so required by the Minister, cease to use the licensed apparatus for such period (not exceeding eight hours in any one day) as may be specified by the Minister.

14. In case of any breach, non-observance or non-performance by or on the part of the licensee of any of the terms or conditions herein contained and on the part of the licensee to be observed and performed, then, and in any such case, the Minister may, by writing, revoke and determine these presents, and the licences, powers and authorities hereinbefore granted, and thereupon these presents, and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

15. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of radiotelegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of radiotelegraphs (whether of a like nature to those hereby licensed or otherwise), or the transmission of messages in any part of Canada, by means of radiotelegraphy, with or to any person or persons whomsoever upon such terms as he shall, in his discretion, think fit.

16. Any notice, request or consent (whether expressed to be in writing or not), to be given by the Minister under these presents may be under the hand of any authorised officer, for the time being, of the Department of the Naval Service, and may be served by sending the same by registered post letter to the licensee, and any notice to be given by the licensee under these presents, may be served by sending the same by registered post letter addressed to the Deputy Minister of the Naval Service, Ottawa.

SHIP LICENCE.

I The herein named................ resident of................. hereinafter called the licensee, is hereby licensed to establish and operate a radiotelegraph station on board the vessel........................ for the term of one year commencing........ .... and terminating on ...., and to install and operate at such station the apparatus mentioned in the schedule hereto, on payment of the sum of one dollar, being the licence fee for the privilege above-named.

This licence is subject to the following terms, conditions and restrictions:

1. In this licence the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something, either in the subject or context, repugnant to such construction, that is to say:

The expression "marine signalling" means signalling by means of any system of wireless telegraphy between two or more ships, between ships and shore stations and any other wireless telegraph station, or between shore stations and ships; and the term "Minister" means the Minister or the Deputy Minister of the Naval Service for the time being.

2. (i.) The licensee shall not establish, install or operate any apparatus for wireless telegraphy, except the apparatus hereinafter called the "licensed apparatus" specified in the said schedule hereto.

(ii.) No tolls, fees or other consideration shall be received, levied, or collected by the licensee until the same have been approved of by the Board of Railway Commissioners.

3. (i.) The licensee shall so operate the licensed apparatus as not to interfere with the working of any wireless telegraph station established in Canada, or with marine signalling on the waters or territory of Canada or neighbouring waters or territory.

(ii.) With a view to preventing such interference as aforesaid, the licensee shall comply with all directions which shall be given to the licensee by the Minister and with all rules prescribed by the Minister for observance by his licensees:

(*a*), With respect to all arrangements to be adopted for the purposes of syntony or enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station;

(*b*) With respect to any alteration of messages which the Minister may think necessary; and

(*c*) Generally with respect to avoiding interference between one wireless telegraph station and another.

(iii.) The licensed apparatus shall not, without the consent of the Minister, be altered or modified in respect of any of the particulars mentioned in the schedule hereto.

4. (i.) The licensee shall, if so required in writing by the Minister, cease to operate the

licensed apparatus for such period (not exceeding .... hours in any one day) as may be specified by the Minister.

5. Subject to the provisions of the licence, and in accordance with the regulations issued from time to time by the Minister, the licensee shall transmit and receive messages by means of the licensed apparatus to and from any coast station or to and from any other ship without regard to the particular system of wireless telegraphy installed at such coast station or such other ship, on equal terms without favour or preference, whether as regards rates of charge, order of transmission or otherwise.

6. The licensee shall not be obliged to transmit and receive commercial messages by means of the licensed apparatus to and from a ship station on a ship registered in a country which does not adhere to the International Radiotelegraphic Convention, unless instructed so to do by the Minister in his regulations.

7. (i.) If and whenever any department of the Government shall require the licensee, his servants or agents to transmit by means of the licensed apparatus any messages on His Majesty's service (including messages to and from ships of His Majesty's Royal Navy or Canadian Government vessels), such messages shall have priority over all other messages, and the licensee, his servants and agents shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof, suspend the transmission of all other messages; and the rates to be charged on such messages shall not exceed half the rates charged the ordinary public.

(ii.) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

8. The licensee shall, so far as possible, receive from all other stations all requests for assistance and all signals of distress, and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in his power.

9. The licensee shall not divulge to any person (other than properly authorised officials of the Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the licensee and transmitted by marine signalling or by any system of wireless telegraphy.

10. All messages transmitted by means of the licensed apparatus shall be copied in full in registers to be kept by the licensee for that purpose, and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its places of origin and ultimate destination and such further particulars as the Minister shall from time to time reasonably require to be shown, messages on His Majesty's service being in such registers distinguished from other messages. The licensee shall preserve all used message forms, written and printed, and transcripts of messages and all other papers for such periods as is from time to time prescribed by the regulations of the International Radiotelegraphic Convention, and such registers and message papers shall be open to the inspection of the Minister or his officers thereto authorised at the head office of the licensee, in Montreal between the hours of 10 a.m. and 5 p.m., on every day except Sunday or a public holiday.

11. The Minister or his officers may from time to time and at all reasonable times enter upon the herein licensed station for the purpose of inspection, and may inspect any apparatus fixed or in use in such station for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations, and the working and user of such apparatus and telegraphic instruments.

12. The licensee shall prepare a detailed return of the messages handled by the licensed station during each month on the forms provided for that purpose by the Minister, and shall forward the same to the Minister at the end of each month.

13. (i.) The licensee shall observe at the said station the provisions of the International Radiotelegraphic Convention as adhered to by His Majesty in respect of the Dominion of Canada and the detailed regulations from time to time made thereunder for carrying such provisions into effect.

(ii.) The licensee shall operate the licensed apparatus in accordance with any regulations which may be issued from time to time by the Minister.

14. Except with the consent in writing of the Minister, the licensee shall not assign or sublet the licence.

15. The licensed apparatus at the said ship station shall be worked only by a person or persons holding a certificate or certificates issued by the Minister.

Certificates shall be granted to persons of such technical proficiency and shall be in such form and subject to such conditions as the Minister may from time to time prescribe.

16. The licensee shall carry this licence on the ship on which the ship station is established under this licence, and also such documents as may be prescribed by the Minister, for the purpose of enabling the licensee to communicate with coast stations in accordance with the rules and regulations of the International Radiotelegraphic Convention of Berlin, 1906.

17. If, and whenever, in the opinion of the Minister or any officer in command of one of His Majesty's ships of war, an emergency shall have arisen in which it is expedient for the public service that the Government shall have control over the transmission of messages by the licensed apparatus, it shall be lawful for the said Minister or officer, by warrant under his hand, to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and, subject thereto, for such ordinary service as to the said Minister or officer may seem fit, and in that event, any person authorised by the said Minister or officer may enter upon the stations of the licensee and take possession thereof and use the same as aforesaid.

(ii.) The Minister or any officer in command of one of His Majesty's ships of war may when he considers such an emergency as aforesaid to have risen, instead of taking possession of the stations of the licensee, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus, either wholly or partly and in such manner as he may direct, and such persons may enter upon the licensee's premises accordingly, or the said Minister or officer

may direct the licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said Minister or officer may prescribe, and the licensee shall obey and conform to all such directions.

(iii.) In any case such as aforesaid, if the licensee shows that during the exercise of any of the powers aforesaid, his receipts for the licensed apparatus with respect to which the said powers have been exercised have been less than his receipts from the same source during a corresponding period, the Government shall pay to the licensee, as compensation for any loss of profit sustained by the licensee by reason of the exercise by the Minister of any of the powers hereby reserved, such sum as may be settled between the Minister and the licensee by agreement or as in case of difference may be determined by arbitration. Provided always that no compensation as aforesaid shall be paid if not so far as the powers hereby reserved to the Minister are exercised for the purpose of preventing direct communication with any of His Majesty's enemies, and, save, with the consent of the Minister no such compensation shall be paid if not so far as the powers aforesaid are exercised for the purpose of preventing direct or suspected communication with any of His Majesty's enemies or of protecting the interests of His Majesty under the apprehension of impending war.

18. In case of any breach, non-observance or non-performance by or on the part of the licensee of any of the terms or conditions herein contained, and on the part of the licensee to be observed and performed, then and in any such case the Minister may, by writing, revoke and determine these presents and the licences, powers and authorities hereinbefore granted, and thereupon these presents, and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void.

19. Nothing in these presents contained shall prejudice or affect the right of the Minister, from time to time, to establish, extend, maintain and work any system or systems of wireless telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit, neither shall anything herein contained prejudice or affect the right of the Minister, from time to time, to enter into agreements for or to grant licences relative to the working and user of wireless telegraphs (whether of a like nature to those hereby licensed or otherwise) for the transmission of messages in any part of Canada, by means of wireless telegraphy, with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit.

20. Any notice, request or consent (whether expressed to be in writing or not) to be given by the Minister under these presents may be under the hand of any authorised officer for the time being of the Department of the Naval Service, and may be served by sending the same by registered letter to the licensee, and any notice to be given by the licensee, under these presents may be served by sending the same by registered letter addressed to the Deputy Minister of the Naval Service, Ottawa, Ontario.

CANARY ISLANDS

(See Spain.)

CAPE VERDE ISLANDS

(See Portugal.)

CEYLON

(See map on p. 259.)

THIS British Colony, lying S.E. of Hindustan (latitude 5° 53.5′ to 9° 50′ N.; longitude 79° 48′ to 81° 52′ E.), possesses a written history dating from 543 B.C., and the Portuguese were the first of European nations to fix a permanent settlement in the Island; this occurred in A.D. 1517. The Portuguese gave place to the Dutch in 1658, and the latter surrendered Ceylon to the British in 1796, possession being confirmed by treaty in 1802. The Island is administered by a Governor aided by an Executive Council of seven and a Legislative Council of twenty-one members.

CONTROL.

This Wireless Station is under the control of the Postmaster-General and Director of Telegraphs. The actual working is vested in the undermentioned officials:—

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. A. E. McCloskey	Chief Telegraph Engineer	Colombo
Mr. G. W. Praat	Superintendent of Traffic	Colombo
Mr. J. R. Stapleton	European Officer of the Wireless Station	Colombo

The rest of the operating staff are Ceylonese members of the Postal Department. The station belongs to the Government. There are no *Experimental*

or *Amateur* or *Ships' Stations* licensed in Ceylon, and no Wireless Clubs or Societies exist in the Island.

ORGANISATION.

The erection of the first Wireless Station for Ceylon was sanctioned by the Ceylon Government in 1910. Finally a site in Colombo was adopted as the best available from an "all-round" standpoint for a single station. The contract for the station was given to the Marconi Wireless Telegraph Co. in 1911 and the station was brought into use in 1912. A further station has been erected and is now in use.

ADMINISTRATION.

Wireless Telegraphy in Ceylon and its territorial waters was originally legislated for under an Ordinance of 1903. In 1908 an Ordinance (No. 35) regulating Telegraphy in general was passed, which was afterwards extended to affect Wireless Telegraphy by an Amending Ordinance (No. 15), passed in 1914. This later Ordinance, however, specifically cancelled a provision, contained in that of 1908, which provided for the continuance in force of the original 1903 enactment. The latter has, therefore, now been completely abrogated, and Wireless Telegraphy in Ceylon is regulated (*a*) by such clauses of the 1908 Ordinance as are applicable to Wireless Telegraphy; (*b*) by the Amending Ordinance (No. 15) of 1914; and (*c*) by the rules formulated under the provision of the latter Ordinance.

We print below the apposite sections of Ordinance 15 of 1914 and the rules based upon it.

A—Ordinance No. 15 of 1914 (August 18th).
B—Rules under this Ordinance.

ORDINANCE

A Ordinance No. 15 of 1914 (modifying Ordinance No. 35 of 1908) and dated August 3rd, 1914, provides in its Clause 5 an amendment of Section 7 of the 1908 Ordinance. This prescribes the right of the Governor in Executive Council to "make rules, consistent with the Ordinance, for the conduct of all or any telegraphs established, maintained, or worked by the Government or by persons licensed under this Ordinance." Rules under this section may provide for all or any of the following, amongst other matters, that is to say:—

(*a*) The rates at which, and the other conditions and restrictions subject to which messages shall be transmitted.

(*b*) The precautions to be taken for preventing the improper interception or disclosure of messages.

(*c*) The period for which, and the conditions subject to which, telegrams and other documents belonging to, or being in the custody of, telegraph officers shall be preserved; and

(*d*) The fees to be charged for searching for telegrams and other documents in the custody of any telegraph officer.

(*e*) For prescribing the form and the manner in which applications for licences under this Ordinance are to be made.

(*f*) For prescribing fees payable on the grant of any licence.

(*g*) For regulating the manner in which an apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of Ceylon, shall be worked so as to prevent interference with naval signalling, or the working of any wireless telegraph or telephone station lawfully established, installed, or worked in Ceylon or the waters thereof, and so as not to interrupt or interfere with the transmission of any messages between wireless telegraph or telephone stations established as aforesaid on land and wireless telegraph or telephone stations established on ships at sea.

(*h*) For prohibiting, except with the special or general permission of the Postmaster-General of Ceylon, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, while such ship is in any of the harbours of Ceylon.

(*i*) For prohibiting or regulating, in case at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of Ceylon, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may deem fit to make from time to time, either in all cases, or in such cases as may be deemed desirable.

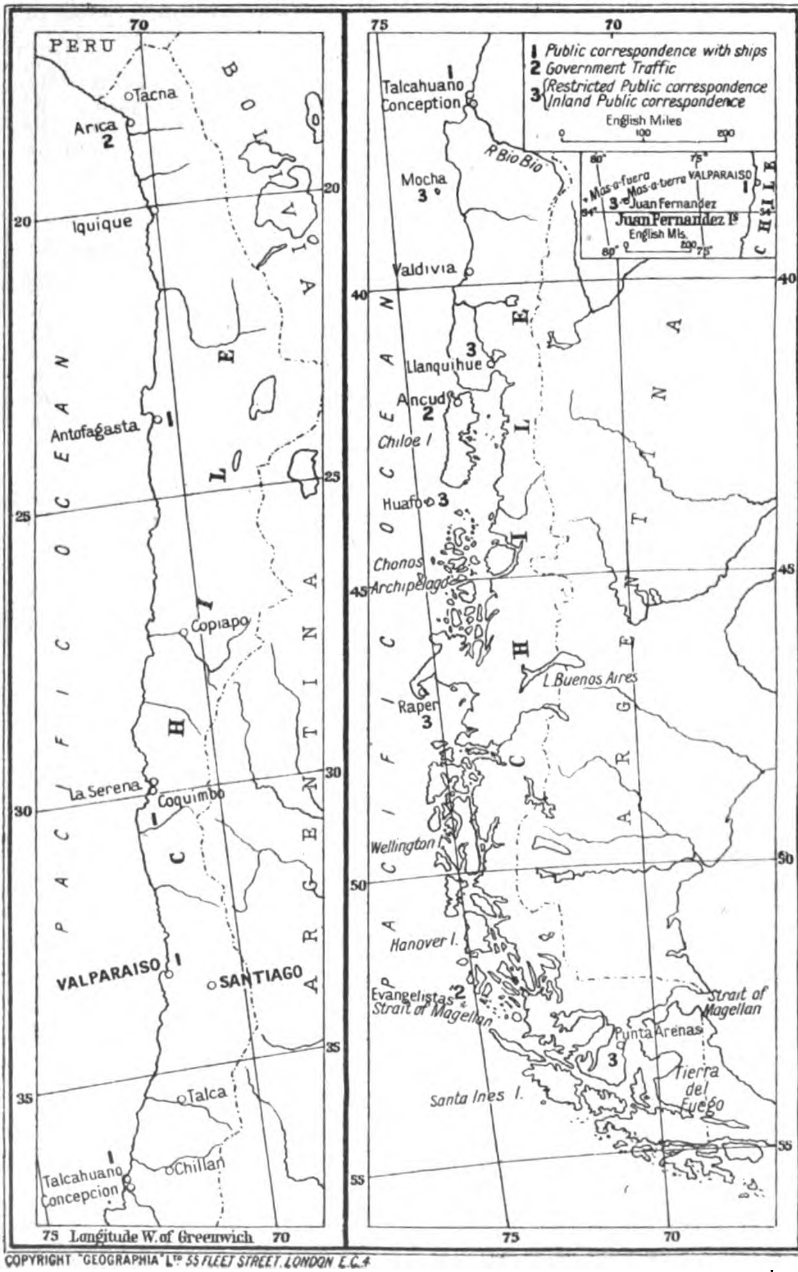
Moreover, Clause 6 of Ordinance No. 15 of 1914 adds to Clause 7 of the 1908 Ordinance a new sub-section lettered (2) A, which runs as follows:

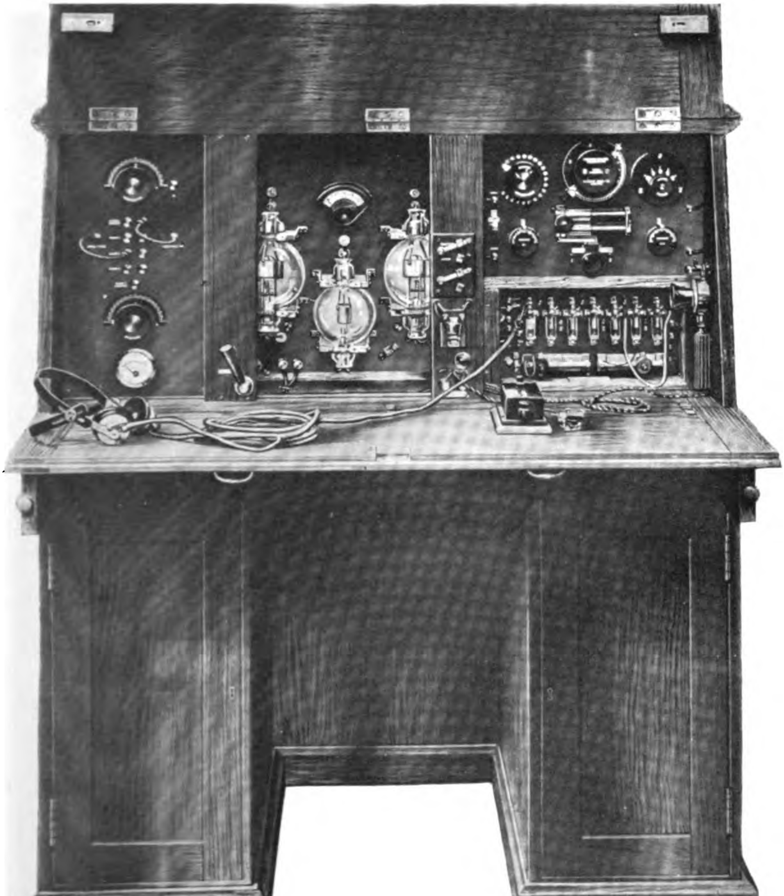
Provided that no regulations made in respect of the matters described in paragraphs (*g*), (*h*), and (*i*) or sub-section (2) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

* * * *

RULES.

B The current rules, under which the wireless telegraphy is at present administered, were issued on December 3rd, 1914. They were based on Ordinance 15 of 1914 (see above) and run as follows;


PERU
BOLIVIA
Tacna
Arica 2
Iquique
Antofagasta 1
Copiapo
La Serena
Coquimbo
VALPARAISO 1
SANTIAGO
Talca
Chillan
Talcahuano
Concepcion
PACIFIC OCEAN
CHILE
ARGENTINA
75 Longitude W. of Greenwich 70
1 Public correspondence with ships
2 Government Traffic
3 Restricted Public correspondence
Inland Public correspondence
English Miles
Mas-a-fuera
Mas-a-tierra
VALPARAISO
Juan Fernandez
Juan Fernandez Is
English Mls.
R Bio Bio
Mocha 3
Valdivia
Llanquihue 3
Ancud 2
Chiloe I
Huafo 3
Chonos Archipelago
L. Buenos Aires
Raper 3
Wellington I.
Hanover I.
Evangelistas 2
Strait of Magellan
Punta Arenas 3
Tierra del Fuego
Santa Ines I.
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MARCONI ½ K.W. COMBINED WIRELESS TELEPHONE AND CONTINUOUS WAVE TELEGRAPH CABINET, SHOWING TRANSMITTING AND RECEIVING VALVES.

[*To face page* 176

DECEMBER 3RD, 1914.

1. Any person desirous of obtaining a licence for the establishment of a wireless telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in the Colony, or on board any British ship registered in the Colony, must apply in writing to the Colonial Secretary. Such application must contain full particulars—

(a) Of the place or ship in respect of which a licence is sought;

(b) Of the nature of the apparatus which it **is desired and proposed to instal and work; and**

(c) Of the purposes for which the installation is intended to be utilised.

2. The following shall be the fees payable on the grant of licences:

	Rs.
(a) For a licence for a land station	5
(b) For a licence for a ship station	5
(c) For an experimental licence ..	Free

3. All apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony, shall be worked in such a way as not to interfere with:

(a) Naval signalling; or

(b) The working of any wireless telegraph station lawfully established, installed, or worked in the Colony or in waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. In these regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station, whether on shore or on any ship.

5. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour, port, or bay of the Colony, except with the special or general permission of the Postmaster-General.

6. (i.) If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, and notice to that effect is published by the Postmaster-General, after the publication of such notice and until further notice the use of wireless telegraphy on board merchant ships, whether British or foreign, whilst in the waters of the Colony, shall be subject to such rules as may be made by the Governor, and such rules may prohibit or regulate such use in all cases, or in such cases as may be deemed desirable.

(ii.) Such notice as aforesaid shall be published in the *Ceylon Government Gazette*, and in such other manner, if any, as to the Postmaster-General may seem fit.

7. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

8. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

9. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

CHILE

(See map opposite.)

THE narrow strip of territory constituting the Republic of Chile lies between that remarkable range of mountains known as the Andes, and the Pacific Ocean. The country is divided into 23 provinces, and the total estimated population in 1915 was about 3½ millions. So far it has not been possible to obtain the text of any laws and regulations affecting radiotelegraphy, but reference to the adjoining map will indicate the *locale* of such wireless stations as are in operation in the territory.

CHATHAM ISLANDS

(See NEW ZEALAND.)

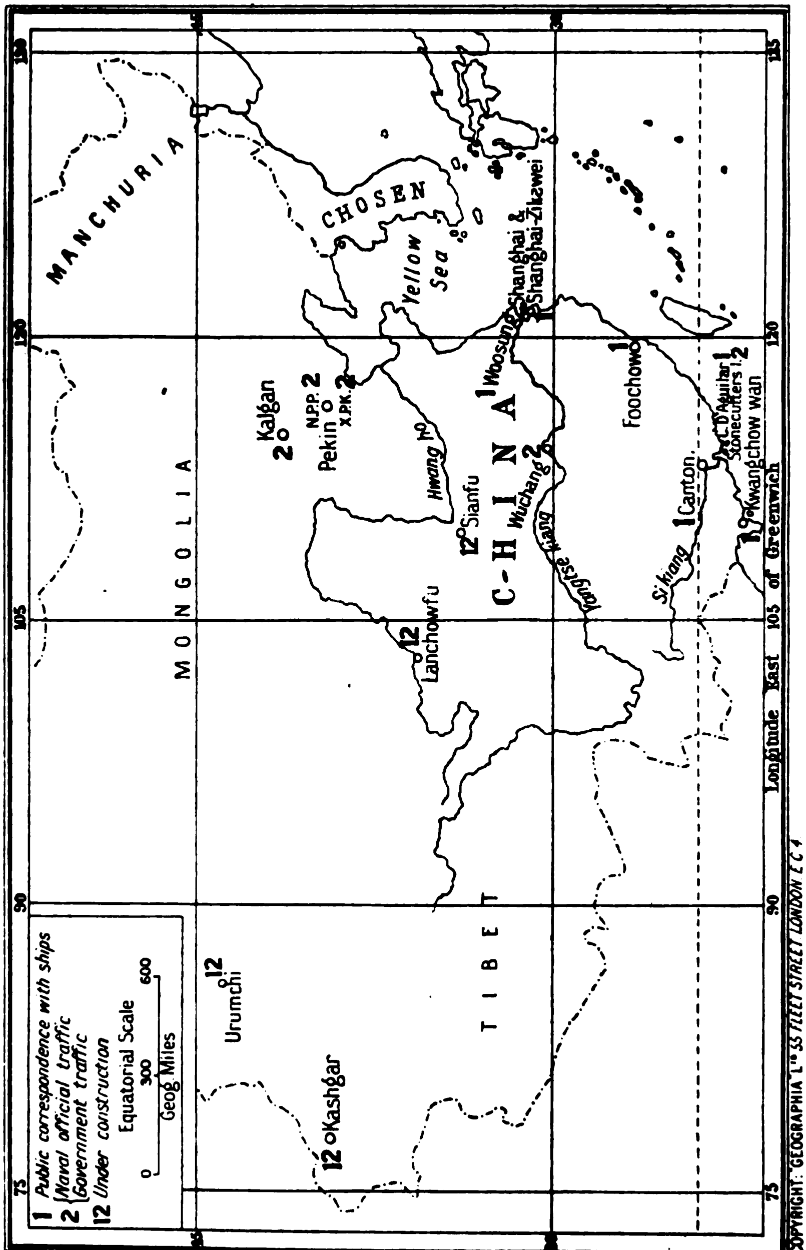
CHINA

(1) FOREIGN SETTLEMENTS

(*For Laws of the Republic see under "Chinese Republic," page* 182.)

(A) Hong-Kong

THE Crown Colony of Hong-Kong consists of a number of islands situated off the south-eastern coast of China, at the mouth of the Canton River, and of a portion of the adjacent mainland. They lie between latitude 22° 10′ and 22° 34′ North; whilst the longitude extends between 113° 52′ and 114° 30′ East. The capital of the Colony is Victoria, built on the northern


1 Public correspondence with ships
2 Naval official traffic
2 Government traffic
12 Under construction
Equatorial Scale
0 300 600
Geog. Miles
MANCHURIA
CHOSEN
Yellow Sea
MONGOLIA
CHINA
TIBET
Kalgan
Pekin
N.P.P.
X.P.K.
Hwang Ho
Sianfu
Lanchowfu
Wuchang
Yangtse Kiang
Woosung
Shanghai & Shanghai-Zikawei
Foochow
Canton
Si Kiang
L.C. D'Aguilar
Stonecutters I.
Kwangchow wan
Urumchi
Kashgar
Longitude East of Greenwich
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shore of Hong-Kong Island, facing the mainland. The magnificent harbour consists of the arm of the sea which lies between the mainland and the city. It was first occupied by Great Britain in January, 1841, and is now administered as a Crown Colony under a Governor aided by an Executive Council of eight members and a legislative council of fourteen.

ORGANISATION.

Hong-Kong possesses two wireless stations, one of them Cape d'Aguilar, and the other at the Royal Observatory. The latter is destined for the reception of time signals from the Far Eastern stations. It is proposed to instal apparatus for distributing time signals by relay via the Cape d'Aguilar radio station. The Government hopes that arrangements may then be made for receiving meteorological observations from ships at stated times.

ADMINISTRATION.

The regulation of wireless telegraphy is carried on under the provisions of the Wireless Telegraph Ordinance, 1913, passed on July 24th of that year, which repealed all previous Ordinances; and by regulations issued under that Ordinance.

A—The Wireless Telegraphy Ordinance, 1913.
B—Regulations.

ORDINANCE No. 20 OF 1913.

A 1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. "Telegraph" means an electric, galvanic or magnetic telegraph and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communications by means of electricity, galvanism or magnetism.

The expression "Wireless Telegraphy" means any system of communication by "telegraph" as (defined in this Ordinance) without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: provided that nothing in this Ordinance shall prevent any person from making or using an electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may whenever he shall deem it expedient to do so license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4. (i.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the colony or on board any British ship registered in the colony except under and in accordance with a licence granted in that behalf by the Governor.

(ii.) Every such licence shall be in such form and for such period as the Governor-in-Council may determine and shall contain such terms, conditions, and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (i.) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(ii.) If a magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (i.) The Governor-in-Council may make regulations for all or any of the following matters:—

(*a*) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(*b*) For prescribing the fees payable on the grant of any licence;

(*c*) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) For prohibiting, except with the special or general permission of the Colonial Secretary, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the colony;

(*e*) For prohibiting or regulating, in case at any time in the opinion of the Governor an emergency has arisen in

which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the colony, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(ii.) Provided that no regulations made in respect of the matters described in paragraphs (*c*), (*d*), and (*e*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions, and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (i.) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(ii.) All convictions, forfeitures, and fines under this ordinance or any regulations made thereunder may be had and recovered before a magistrate.

9. The Wireless Telegraphy Ordinance, 1903, the Wireless Telegraphy Ordinance, 1909, and the Wireless Telegraphy Amendment Ordinance, 1909, are hereby repealed.

B The following regulations were made by the Officer Administering the Government in Council under the provisions of Section 6 of the Wireless Telegraphy Ordinance No. 20 of 1913, on November 20th, 1913:—

1. Any person desirous of obtaining a licence for the establishment of a wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the colony, or on board any British ship registered in the colony, must apply in writing to the Colonial Secretary. Such application must contain full particulars—

(*a*) of the place or ship in respect of which a licence is sought;

(*b*) of the nature of the apparatus which it is desired and proposed to instal and work; and

(*c*) of the purposes for which the installation is intended to be utilised.

2. The following shall be the fees payable on the grant of licences:—

(*a*) For a licence under Section 3 for a land station $2.50

(*b*) For a licence under Section 3 for a ship station $2.50

(*c*) For an experimental licence under Section 7 .. .. .. Nil

3. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the colony shall be worked in such a way as not to interfere with—

(*a*) Naval signalling; or

(*b*) The working of any wireless telegraph station lawfully established, installed, or worked in the colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the colony except with the special or general permission in writing of the Colonial Secretary of the colony.

5. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that his Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. No proceedings shall be taken against any person under these Regulations except with the previous sanction of the Attorney-General.

(B) Weihaiwei

WEIHAIWEI, a territory in the Shantung district of China, leased by that Republic to Great Britain in 1898, lies in latitude 37° 30′ N. and longitude 121° 40′ E. The total area comprises 285 square miles.

CONTROL.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Sir J. H. Stewart Lockhart, K.C.M.G.	Commissioner of Weihaiwei	Government House, Port Edward, Weihaiwei
Mr. A. P. Blunt	Senior District Officer ..	Government Offices, Port Edward, Weihaiwei

ADMINISTRATION.

Wireless Telegraphy in the territory is governed by:

ORDINANCE No. 5 OF 1913.

AN ORDINANCE TO PROVIDE FOR THE REGULATION OF WIRELESS TELEGRAPHY.

L.S.

August 11th, 1913.

BE IT ENACTED by the Commissioner of Weihaiwei as follows:—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. "Telegraph" means an electric, galvanic or magnetic telegraph, and includes appliances and apparatus for transmitting or making telegraphic, telephonic or other communications by means of electricity, galvanism, or magnetism.

The expression "Wireless Telegraphy" means any system of communication by "telegraph" (as defined in this Ordinance) without the aid of any wire connecting the points from and at which the messages or other communications are sent and received: provided that nothing in this Ordinance shall prevent any person from making or using an electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Commissioner may whenever he shall deem it expedient to do so license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the territory or on board any British ship registered in the territory.

4. (i.) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the territory or on board any British ship registered in the territory except under and in accordance with a licence granted in that behalf by the Commissioner.

(ii.) Every such licence shall be in such form and for such period as the Commissioner may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Commissioner shall consider desirable in the public interest.

5. (i.) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Commissioner.

(ii.) If a magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6 (1) The Commissioner may make regulations for all or any of the following matters:—

(i.) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(ii.) For prescribing the fees payable on the grant of any licence;

(iii.) For regulating the manner in which apparatus for wireless telegraphy on board a merchant ship whether British or foreign in the waters of the territory shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed or worked in the territory or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(iv.) For prohibiting except with the special or general permission of the Commissioner the working or using of any apparatus for wireless telegraphy on board a merchant ship whether British or foreign whilst such ship is in any of the harbours of the territory;

(v.) For prohibiting or regulating in case at any time in the opinion of the Commissioner an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships whether British or foreign in the waters of the territory the use of wireless telegraphy on board such ships while in such waters by such further rules as the Commissioner may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (iii.), (iv.) and (v.) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Commissioner that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions and restrictions as the Commissioner may think proper, but shall not be subject to any rent or royalty.

8. (i.) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine of five hundred dollars.

(ii.) All convictions, forfeitures and fines under this Ordinance or any regulations made thereunder may be had and recovered before a magistrate.

9. Ordinance No. 1 of 1904 to regulate the establishment of wireless electric telegraphs is hereby repealed.

(2) CHINESE REPUBLIC

THE Republic of China comprises China Proper (eighteen provinces), Manchuria, Mongolia, Sinkiang, and Tibet. It lies between 18° 13′ and 56° 40′ North latitude, and between 71° 51′ and 133° 52′ East longitude. The total area of the eighteen provinces and four dependent territories is estimated at 4,277,170 square miles.

The Republic in its present form was established on October 10th, 1911. The constitution, drafted by the first Parliament, that met on April 8th, 1913, laid down the basis of government under which this great Republic is now governed. The executive power is vested in a President; whilst the legislative authority is exercised by a National Congress, comprising a Senate and a House of Commons.

CONTROL.

Radiotelegraphy in China is owned and controlled by the Government, and its administration is regulated by the Department of Telegraphs, Ministry of Communications. The Ministry of War and the Ministry of Marine control the use of Radiotelegraphy in the Army and the Navy respectively.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Name of Official.	*Title.*	*Address.*
Tseng Yu Tsün	Minister of Communications	Peking, Chiaotungpu
Tsiang Tsen Yi	Director General (and Chief of the Department) of Telegraphs, Commissioner of Codification of Telegraphy and Telephony, Ministry of Communications	Peking, Chiaotungpu
Lin Tze Sue	Electrical Engineer, Chief of the Traffic Sub-Department, Department of Telegraphs	Peking, Chiatotungpu
A. H. Eriksen	Adviser and Foreign Chief Superintendent	Peking, Chiaotungpu
A. Jörgensen	Wireless Engineer and Instructor in Radiotelegraphy at the College of Post and Telegraphy	Peking, Chiaotungpu
S. T. Dockray	Wireless Engineer	Peking, Chiaotungpu
Admiral Sah Cheng Ping	Minister of Navy	Peking, Naval Board
Sü Chen Peng	Vice-Minister of Navy	Peking, Naval Board
Chen En Tao	Chief of the MilitaryDepartment, Naval Board	Peking, Naval Board
General Chiu Yuen Peng	Minister of War	Peking, Board of War
Loo Kai Pun	Vice-Minister of War	Peking, Board of War

ORGANISATION.

The coast and inland stations administered by the Ministry of Communications are ten in number, including those of Woosung, Canton, Foochow, Shanghai, Tsungming, Wuchang, Kalgan, and Peking, of which the last five are coast stations open for public service, while the remaining three are official stations. Three new stations of the Marconi type (25 kw.) will be erected at Kashgar, Tihwafu (Urumtsi), and Urga. One 50 kw. station and five 5 kw. stations will be erected in Yunnan Province. These stations will be of the Poulsen type.

It has been proposed to erect several small stations of from 1½ to 5 kw. in Outer Mongolia and at some important points in Chihli Province.

The Naval Board has purchased a very large station of 500 kw. from a Japanese factory. The erection of this station will be started in 1920.

A *Radio Training Station* was opened in Peking in 1913. It is controlled by the Ministry of Communications.

ADMINISTRATION.

At present radiotelegraphy in China awaits development, and the laws and regulations affecting the subject consist, therefore, of those formulated

to govern the working of the ordinary wired telegraph, and telephone, applied, as far as they are applicable, to radiotelegraphy. For this reason we present here a translation of the Chinese general regulations affecting all electrical means of communication, with a few comments emphasising the points which appear to affect wireless telegraphy, and also form of licence for pilot boats.

A—Instructional Order No. 20.
B—Form of Licence for Pilot Boats.

INSTRUCTIONAL ORDER No. 20.

A Dated April 18th, in the fourth year of the Republic of China—*i.e.*, 1915.
REGULATIONS AFFECTING ELECTRICAL MEANS OF COMMUNICATION.

ART. 1.—All telegraphs and telephones, whether wired or wireless, shall be included in the term "Electrical means of Communication."

ART. 2.—All electrical means of communication shall be owned and controlled by the State.

ART. 3.—The following electrical means of communication may be set up by private individuals or corporations after the sanction of the Government has been obtained:

(a) Those established for the exclusive use of railways, mines, or other specific and commercial enterprises.

(b) Those which are set up by individuals or corporations or official departments on their premises for the purpose of establishing connection with a public telegraph office for the convenience of the transaction of the business carried on by the said individuals or corporations.

(c) Those which are used by individuals, corporations, or official departments for intercommunication between various parts of the building in which they are located.

(d) Those which are used by ships *in transitu*.

(e) Those which are set up for the purpose of experiment or research.

(f) Telephones whose calling powers are to be confined within a certain definite area. These must not, however, be erected in any area which is at present furnished with telephonic communication.

[This clause appears to be one intended to apply to future telephone installations and not to any which may be at present erected. Of the above items it will be noted only (d) and (e) can apply to wireless telegraphy.]

ART. 4.—The Government, in case of necessity, may, in accordance with the provision of Laws and Edicts, seize all private electrical means of communication and convert them to public or military use. When, under the provision of this regulation, the Government so seize and make use of private owned electrical means of communication, it may appoint officials to take charge of and work them.

ART. 5.—When the Government consider it necessary in the interests and for the maintenance of public safety, they can restrict, suspend or cancel any use of electrical means of communication within certain prescribed areas.

ART. 6.—The Superintendent officials at telegraph offices controlled by the Government may suspend the transmission of any message or refuse altogether to accept it, when they consider its contents to be opposed to public safety.

ART. 7.—When special circumstances or *force majeure* cause telegrams to be delayed in transmission or prevent their transmission, the senders cannot claim compensation for damage arising from such delay or hindrance.

ART. 8.—Correspondents are themselves responsible for the contents of their messages.

ART. 9.—With regard to the transmission of telegrams or telephone messages no exemption with regard to liability or responsibility can be entertained on the ground of mental deficiency on the part of the sender.

ART. 10.—Telegrams received at public telegraph offices—other than those specified by Government orders—will be delivered in accordance with the addresses given by the sender. If, owing to the fact that the address given is incorrect or insufficient, the telegram cannot be delivered, this fact will be publicly announced, and if no application for the message is received within forty-two days from the date of the public announcement, the said message will be destroyed.

ART. 11.—When messages are received in secret code, or in obscure or metaphorical language, the telegraph officials may, if they think fit, call upon the sender to translate the code or elucidate the meaning of the message. If the sender refuses to de-code or explain, or, in complying with this request, fail to put the telegraph official truthfully in possession of the real meaning of the message, the official may stop the transmission of the said message.

ART. 12.—Officials, workmen, or messengers engaged in the performance of their duty in connection with telegraphs or telephones are not to be interfered with or stopped by the authorities of the customs or by those operating the canal locks.

ART. 13.—Officials, workmen, or messengers when proceeding in discharge of their official functions are to be allowed unhindered transit over building-land and fields (with the exception of those enclosed by walls and gateways) whenever there may be any hindrance to their transit through the regular streets or paths. But if the passage of such officials, workmen, or messengers causes damage to be done to buildings, or to crops in cultivated property, the Government will pay adequate compensation on the application of the owner and on his proof of such damage.

ART. 14.—When officials, workmen or messengers engaged in performing their official functions ask for help or assistance in order to overcome any special hindrance in transit, or when they ask for assistance in climbing mountains or crossing rivers, the persons to whom such request is made may not refuse such help or assistance without assigning adequate reason for so doing. But in the event of such assistance being rendered, the Government will give the person rendering it fit and proper remuneration for such aid and assistance, on his application for such remuneration.

ART. 15.—Telegraph or telephone wires may be set up at convenient places, no matter through what property it is necessary for them to pass; but if their erection involves an encroachment on the rights of others, whether private individuals or corporations, the

Government will on application, allot adequate compensation for such encroachment.

Art. 16.—Charges for telegrams and telephone messages shall be collected in cash according to fixed rates.

Art. 17.—Materials used for the purposes of Telegraph and Telephone Services shall be exempted from tax, but not from Customs Duties.

Art. 18.—With reference to the compensation for damage caused, and the right of application for remuneration referred to in the above clauses in connection with the carrying out of Electrical Means of Communication, the period within which such right to compensation or remuneration may be dealt with, and the manner in which it may be so dealt with and adjudicated, shall be regulated by separate "Instructional Orders."

Art. 19.—Any who may offend against Articles 2, 3, 4, 12, 13, and 14, shall be liable to a fine of from 5 to 200 dollars. Those who offend against Articles 2 and 3 shall, in addition to fines, be liable to confiscation of poles, wires, machines or other apparatus.

Art. 20.—The conditions laid down in Articles 12-19 shall not be applicable to private electrical means of communication, but the specially authorised telephones erected under section (*f*) or Article 3 may adopt the regulation comprised in Article 16.

Art. 21.—All Laws, Orders or Treaties affecting telegrams between China and Foreign Countries shall have their respective provisions observed and the provisions of this Instructional Order shall not be held to modify or abrogate them.

Art. 22.—These regulations shall come into force immediately on the date of their promulgation.

FORM OF LICENCE FOR PILOT BOATS IN CHINESE WATERS.

B The .... (hereinafter called "the Licensee") is hereby granted Licence to operate within the pilot district of .... the wireless telegraph system installed on board the Pilot Boat ...., as specified in the schedule hereto for the period commencing the .... and terminating on the ...., on payment of the sum of ten Mexican dollars, being the licence fee for the privilege above named.

This licence is subject to the following terms, conditions and restrictions :—

1. The Licensee shall not establish, instal or operate any apparatus for wireless telegraphy, except the apparatus hereinafter called the "licensed apparatus" specified in the said schedule hereto.

2. The range of signalling shall at no time exceed one hundred nautical miles.

3. The Licensee shall use the licensed apparatus solely for the purpose of exchanging with ships at sea messages relating to the safe and prompt working of the licensee's pilot service, and for making or answering calls of distress. However messages originating or terminating on board the aforesaid pilot boat may be exchanged with the Chinese wireless coast stations at .... on payment of the ordinary charges accruing to the Chinese Telegraph Administration for wireless messages exchanged by means of the said .... stations. Payment of such charges shall be made in such manner as the Ministry of Communications shall direct.

4. The licensed apparatus shall not be used by the Licensee or by any other person either on behalf or by permission of the Licensee for the transmission or receipt of messages, except messages authorized under paragraph three.

5. All telegrams exchanged by means of the licensed apparatus shall be copied in full in registers to be kept by the Licensee for that purpose. Such registers as well as the licensed apparatus shall be open to inspection by thereto authorized officers of the Chinese Telegraph Administration.

6. The Licensee shall operate the licensed apparatus in accordance with any regulations which may be issued from time to time by the Ministry of Communications.

7. The Licensee shall observe the provisions of the International Radiotelegraphic Service Regulations of 1912, as regards transmission of messages (Article XX—Article XXXIV.) in so far as they are not inconsistent with the rights and privileges granted by these presents.

8. The Licensee shall so operate the licensed apparatus so as not to interfere with :—

(*a*) Naval signalling by means of any system of wireless telegraphy between two or more ships of the Chinese Navy or between a ship of the Chinese Navy and any other wireless station, whether on shore or on any ship ;

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in China or the territorial waters thereof, and in particular the licensed apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations on ships at sea.

9. The Licensee shall not work or use the licensed apparatus whilst the boat is in the harbour of ...., except with the special permission in writing of the Ministry of Communications.

10. Regulations 8 and 9 shall, however, not apply to the use of the licensed apparatus for the purpose of making or answering signals of distress.

11. The licensed apparatus shall not, without the consent in writing of the Ministry of Communications, be altered or modified in respect of any particulars mentioned in the schedule hereto.

12. The Licensee, in case the aforesaid pilot boat be sold or dispensed with and remain in Chinese waters, shall remove the wireless apparatus before transfer of ownership takes place.

13. The Licensee shall operate the licensed apparatus only during the hours indicated on the schedule hereto, except for the purpose of making or answering signals of distress.

14. The Licensee shall at all times indemnify the Ministry of Communications against all actions, claims and demands which may be brought or made by any corporation, company or person in respect of any injury arising from any act licensed or permitted by these presents.

15. If, and whenever, in the opinion of the Ministry of Communications, the interests of the Government of China demand that the use of the licensed apparatus shall be prohibited or shall be under full control of the said Government, the Licensee shall conform to all directions prescribed by the Ministry of Communications.

16. In case of any breach, non-observance or non-performance by or on the part of the Licensee of any of the terms or conditions

herein contained and on the part of the Licensee to be observed and performed, the Licensee shall be liable for every such breach, non-observance or non-performance to a penalty of one hundred Mexican dollars, and in every such case the Ministry of Communications may, by writing, revoke and determine these presents, and the License herein granted shall become null and void.

17. This License or a confirmed duplicate of it shall always be carried on board the aforesaid Pilot Boat.

The Schedule of Ship Stations before referred to:—

1. Name of ship on which station established.
2. Nationality.
3. Call Signal.
4. Normal range of signalling in nautical miles:—
   (a) by day;
   (b) by night.
5. Character of apparatus:—
   (a) Radiotelegraph system * with the characteristics of the system of emission;
   (b) Wave-lengths in metres (the normal wave-length to be underlined).
6. Hours of service.
7. Power:—
   (a) Source and maximum output;
   (b) Maximum antenna energy.
8. Alternator:—
   Number of cycles per second.

COCHIN-CHINA

(See map on p. 211.)

COCOS-KEELING ISLANDS

(See STRAITS SETTLEMENTS and map on p. 129.)

COLOMBIA

THE Republic of Colombia lies between latitude 2° 40′ S. and 12° 25′ N., its longitude extending from 68° 0′ to 79° 0′ W. Its superficial area is estimated at 461,606 square miles, its population at 5½ millions. The country is intersected by three great ranges of the Andes Mountains known as the Western, Central and Eastern Cordilleras, the latter of which is the more



important as it affords a series of vast table-lands, cool and healthy. Railroads are in their infancy and the telegraphic wiring is estimated at a little under 9,000 miles.

CONTROL.

Control of radiotelegraphy in Colombia is vested in the Minister of the Interior, who is ultimately responsible, whilst the executive authority is wielded by the Minister of Posts and Telegraphs.

ORGANISATION.

The station of Santa Marta was the first wireless installation in the Republic, that of Cartagena being next in order, the most recent being the Government station of San Andres y Providencia. There are six new stations under construction.

ADMINISTRATION.

No special regulations have been issued through the medium of wireless legislation, but in accordance with the current Colombian laws wireless as well as wired telegraphy constitutes a Public Service under State control in every way. The Government does, however, in certain special cases grant permission for contracts, under which radiotelegraphic service may be instituted by private companies. As instances of such concessions we may cite the stations of Santa Marta and Cartagena, installed by the "United Fruit Company" and the "Gesellschaft für Drahtlose Telegraphie m.b.H." respectively. The Government only owns and works in the territory of the Republic a single station, located in the Archipelago of San Andres y Providencia, and erected by the last-named company.

COMMONWEALTH OF AUSTRALIA

(See AUSTRALIA.)

COMORO ISLANDS

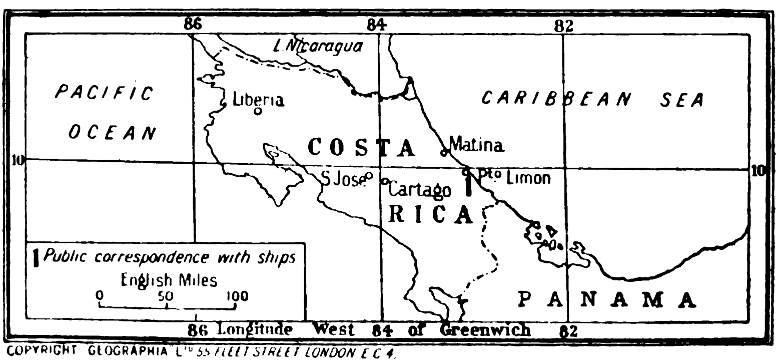
(See map on p. 353.)

COOK ISLANDS

(See map on p. 334.)

COSTA RICA

THE smallest of the Central American republics, its territory lies between the independent republic of Panama on the east and that of Nicaragua on the north. In area it covers about 23,000 square miles,



and possesses approximately 430,000 inhabitants. According to the latest statistics, there is but one wireless station, situated at Limon, the Atlantic port for the capital, San José. It conducts public correspondence with ships. The position is shown on map on page 186.

CRETE

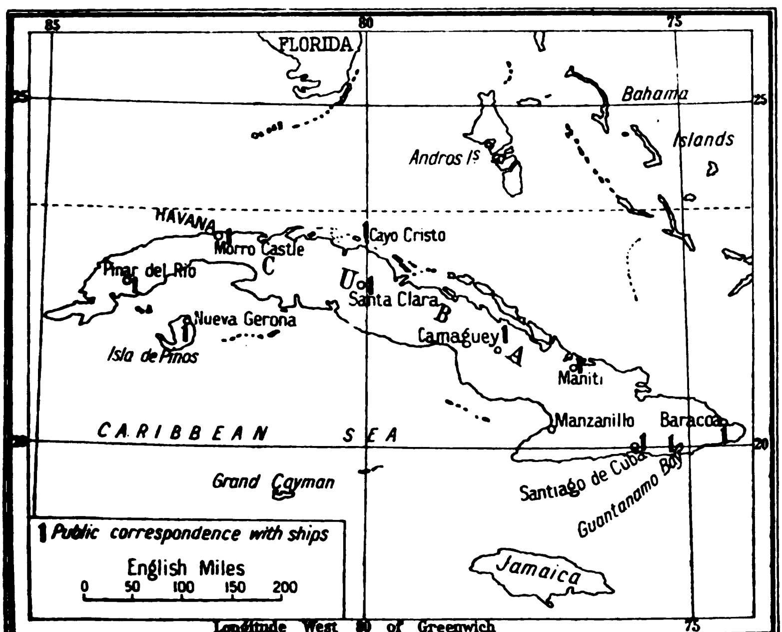
CRETE, or Candia, by which name this interesting and mountainous land is sometimes known, forms the largest of the islands of the Greek archipelago and constitutes part of the island barrier separating the Ægean Sea from the main body of the Mediterranean. Its length is about 140 miles and its breadth averages less than 30.

The only wireless apparatus (concerning which no details are forthcoming) existing in this island was erected during the late European war for the use of the British Naval and Royal Air Force base at Suda Bay.

Before the war a site was selected near a village in the vicinity of Canea, and the construction of a wireless station was begun under the superintendence of Greek officials sent for the purpose from Athens. The work was suspended on the outbreak of hostilities, and has not yet been resumed.

CUBA

THE largest of the islands in the Caribbean Sea, the territory of Cuba occupies an area of about 44,000 square miles—*i.e.*, roughly one-third the size of the United Kingdom. The capital city is Havana, with a population of about 360,000. The country was in Spanish occupation from its



discovery until the signature of the Paris Treaty in December, 1898, when it assumed independence. The language of the country, however, remains Spanish.

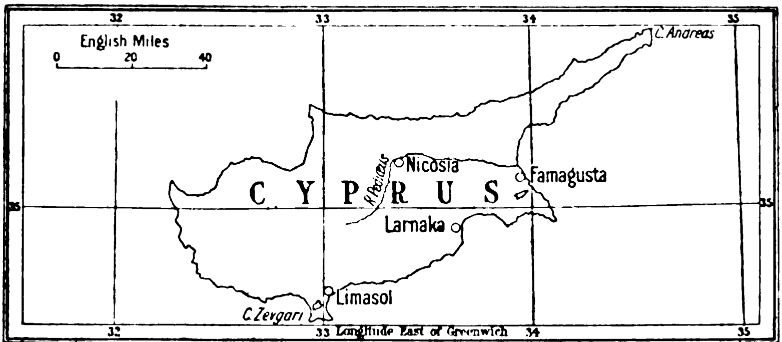
There are some ten wireless stations in the republic, open to public correspondence with ships, and their position is shown on the map on page 187.

CURAÇAO

(See NETHERLANDS.)

CYPRUS

THE declaration of war upon Turkey by the British Government on November 5th, 1914, released this island from allegiance to the Ottoman Empire, and it was thereupon annexed by Great Britain. Occupying a strong strategical position in the Levant, it proved of immense value to the Allies during the late world conflict. At its shortest distance (to Asia Minor) it lies 35 miles from the mainland, whilst about 50 miles separate it from the nearest point on the Syrian coast. The island constituted the base for several of the Egyptian campaigns as its climate forms a pleasant and refreshing contrast to the tropical heat of the North African deserts. In area it covers 3,584 square miles. The government of the island is administered by a High Commissioner (appointed by Great Britain) with the advice and consent of the Legislative Council.



ADMINISTRATION.

The following Act provides for the regulation of wireless telegraphy in Cyprus :—

A—Wireless Telegraphy Law, 1913.

A Law enacted by His Excellency the Officer Administering the Government of the Island of Cyprus, with the advice and consent of the Legislative Council thereof, to provide for the Regulation of Wireless Telegraphy.

A Be it enacted by His Excellency the Officer Administering the Government of the Island of Cyprus, with the advice and consent of the Legislative Council thereof, as follows :—

1. This Law may be cited as the Wireless Telegraphy Law, 1913.

2. In this Law :—

"Wireless telegraphy" means any system of transmitting messages or other communications by means of electric galvanic or magnetic signals without the aid of any wire connecting the points from and at which the messages or other communications are sent and received, and includes any apparatus for transmitting or receiving such messages or other communications.

Provided that nothing in this Law shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The High Commissioner in Council may whenever he shall deem it expedient to do so license the establishment of any wireless telegraph station or the installation or working

of any apparatus for wireless telegraphy in any place in Cyprus or on board any ship registered in Cyprus.

4.—(1) No person shall establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place in Cyprus or on board any ship registered in Cyprus except under and in accordance with a licence granted in that behalf by the High Commissioner.

(2) Every such licence shall be in such form and for such period as the High Commissioner in Council may determine and shall contain such terms conditions and restrictions on and subject to which the licence is granted as the High Commissioner in Council shall consider desirable in the public interest.

5.—(1) If any person establishes a wireless telegraph station without a licence in that behalf or installs or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one hundred pounds or to imprisonment with or without hard labour for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence but no proceedings shall be taken against any person under this Law except with the previous sanction of the King's Advocate.

(2) If a judge of a District Court or of the Supreme Court is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant authorising the person to whom it is addressed to enter and inspect the station place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6.—(1) The High Commissioner in Council may make regulations for all or any of the following matters:—

(*a*) for prescribing the form and manner in which applications for licences under this Law are to be made;

(*b*) for prescribing the fees payable on the grant of any licence;

(*c*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship of any nationality in the waters of Cyprus shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established installed or worked in Cyprus or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) for prohibiting except with the special or general permission of the Island Postmaster the working or using of any apparatus for wireless telegraphy on board a merchant ship of any nationality whilst such ship is in any of the harbours of Cyprus;

(*e*) for prohibiting or regulating in case at any time in the opinion of the High Commissioner an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships of any nationality in the waters of Cyprus the use of wireless telegraphy on board such ships while in such waters by such further rules as the High Commissioner may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (*c*) (*d*) and (*e*) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the High Commissioner in Council that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms conditions and restrictions as the High Commissioner in Council may think proper but shall not be subject to any rent or royalty.

8.—(1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Law or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Law and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine not exceeding fifty pounds.

(2) All convictions forfeitures and fines under this Law or any Regulations made thereunder may be had and recovered before a District Court.

9. This Law shall come into operation on the 1st day of July, 1913.

Passed in Council the twenty-third day of May, in the year of Our Lord one thousand nine hundred and thirteen.

DEMERARA

(See British Guiana.)

DENMARK

(See map on p. 329.)

THE area of the Kingdom of Denmark, according to the survey of 1911, and before the recent plebiscite, totalled 15,582 square miles. The country is ruled under a Constitutional Monarchy, the Crown of Denmark having been elective from the earliest times.

The territory ruled by King Christian X includes the peninsula of Jutland

and several islands in the Baltic Sea, the most important of which are Sealand and Funen; furthermore the Faroe Islands (north of the Shetlands) and Greenland. The Government is what is called Parliamentary Government, the executive power being vested in the Sovereign (acting through his Ministers) assisted by the Cabinet consisting of ten Secretaries of State and one Minister without portfolio, whose power rests upon the possession of a majority in the Lower House (Folketinget). The Constitution rests on the fundamental law of June 5th, 1849. This fundamental law has, however, been revised by Parliament, was ratified by the King on June 5th, 1915, and became effective on May 6th, 1918.

CONTROL.

Wireless Telegraphy is naturally of considerable importance to a maritime nation like that of the Danes, whose fatherland is at no point any great distance from the sea. It is a Government monopoly, and the administration is supervised by the Minister of Public Works.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
J. Hassing Joergensen ..	Secretary of State for Public Works	Copenhagen K., Slotsholmsgade 6
N. Meyer	Director of Telegraphs	Copenhagen B., Vesterbrogade 40–42
W. Thomsen	Engineer in Chief of the Telegraph Department	Copenhagen B., Vesterbrogade 40
W. Bjarnov	Chief Engineer, Inspector of Wireless Installations and Instruction	Copenhagen B., Vesterbrogade 42
H. Schledermann.. ..	Electrical Engineer in Chief, Royal Danish Navy, Inspector of Wireless Installations and Instruction	Royal Dockyard, Copenhagen C

ORGANISATION.

Originally radiotelegraphy was adopted in Denmark by the Lighting Department (1901) and by the Royal Navy (1902) but later on the commercial use of radiotelegraphy was organised under the supervision of the Telegraph Department and the State Railway Department (both acting under the jurisdiction of the Department of Public Works); the Naval Department and the Lighting Department (both under the Admiralty), and the War Office. These various departments exercise jurisdiction independently over their own radiotelegraphic section.

The first stations erected were those at Blaavandshuk (lighthouse) and on board the Horns Rev (lightship), both of them dating from 1901. The latest available statistics enumerate :—

LAND STATIONS.

(*a*) Eight directly controlled by Government (two of them situated in the Faroe Islands).
(*b*) One experimental station (Lyngby Radio), belonging to the Telegraph Department (not included under (*a*)).
(*c*) Two instructional stations (Svendborg Radio), with corresponding station Jylland (frigate).

SHIP STATIONS.

(*a*) One hundred and four with lower power.
(*b*) Sixty Government vessels.
(*c*) Forty-four private vessels.

No forms of license for radiotelegraphic working have been issued. The regulations for the erection and operation of private wireless stations are under revision, but it is not yet possible to give details. Laws regarding wireless in its application to aviation are also projected, but so far have not eventuated. The Danish Government contemplates the purchase of a radiotelegraph station for the reception of time and meteorological signals.

ADMINISTRATION.

The first Act to regulate radiotelegraphy in Denmark was passed in 1907 (Act No. 99 of April 19th) and appears *in extenso* in the YEAR-BOOK for 1917, p. 194. New regulations became effective on July 1st, 1913, and these also appear in the YEAR BOOK for 1917, p. 195. Both are reprinted below.

Special regulations for experimental stations, instructional stations, etc., became effective in August, 1914, and are given *in extenso* on pages 194–196.

The following Acts are those under which the regulation is at present conducted, although we understand that preparations are being made for considerable radiotelegraphic activity :—

A—Act 99 of 1907.
B—Rules dated July, 1913.
C—Regulations for Special Stations.

A The regulations affecting Wireless Telegraphy in Denmark are based upon :

ACT No. 99 OF APRIL 19TH, 1907.

1. The Government shall have the sole right to erect and operate wireless telegraphs (radiotelegraphs) within the Danish boundaries and maritime territory.

2. Telegraph stations on board ships under foreign flag must only be utilised on Danish maritime territory when following the regulations to be drawn up in this respect by the Minister for Public Works. The Minister may prohibit every kind of telegraphic communication from such stations and take the necessary measures to carry through such prohibition, when in his opinion circumstances require it.

3. On board ships under Danish flag, not owned by the Government, telegraph stations must only be fitted and operated both on and outside Danish maritime territory according to licence previously obtained from the Minister of Public Works. In case the conditions concerning the fitting and working of the station stipulated in the licence are not maintained, the Minister may cancel the licence.

In case it is desired that the working of stations being in operation at the time when the Act comes into force, should be continued, an application to that effect must be filed with the Minister for Public Works not later than four weeks after the Act has come into force, the Minister having then to decide whether and on what conditions the operation of the station may be continued.

4. Scientific and technical trials with wireless telegraphy must be made by no others than the State Authorities unless permission to that effect has been previously obtained from the Minister for Public Works.

5. The regulations stipulated in Act No. 84 of May 11th, 1897, Art. 17, concerning the duty as to secrecy incumbent on the officers and functionaries of the Telegraph Department and concerning the punishment they may be subjected to in the case of a breach of the aforesaid duty, should also be applicable to wireless operators. The regulations stipulate in Art. 18 of the same Act concerning corresponding regulations for employers of private companies may also be made applicable towards operators on board ships.

6. Any contravention of the regulations given in Articles 1–4 shall be punished, provided that the circumstances concerned according to their nature do not inflict a more serious punishment, with forfeiture of the apparatus unlawfully placed and utilised. Furthermore, the contravening person may be liable to a fine of up to 400 kroner, which fine shall devolve to the Treasury. Such contraventions shall be dealt with in the same way as public police cases. The Minister for Public Works shall be the only person entitled to institute proceedings against contraveners of this Act

REGULATIONS.

B MADE EFFECTIVE ON JULY 1ST, 1913.
In accordance with Act No. 99 of April 19th, 1907, concerning wireless telegraphs (radiotelegraphs) and the International



Convention concerning radiotelegraphs drawn up in London on July 5th, 1912, supplemented by appendix decisions, finishing protocol and service regulations, the following decisions shall be observed in founding and working of radiotelegraph stations and in the handling of radiotelegrams :

I.—Establishing of Radiotelegraph Stations.

1. On Danish soil and on board ships permanently anchored such as lightships, etc., radiotelegraph stations (coast stations) can only be established by the Government.

2. On board ships under Danish flag, not owned by the Government, radiotelegraph stations (ship stations) may only be established and operated after permission has been previously obtained from the Department of Public Works.

The licence or a certified duplicate of it must always be kept on board the ship.

The licence may be withdrawn if the conditions for the fitting and operation of the station, set out therein are not complied with ; in such cases the entire apparatus belonging to the station must be removed.

3. Applications for licences to establish and operate radiotelegraph stations on board ships sailing under the Danish flag must be drawn up on forms approved of by the Department of Public Works, delivered and sent in duplicate to the Telegraph Department, and must be supplied with an endorsement to the effect that the station will fulfil the following conditions :

(a) The waves transmitted must be as pure and as little damped as possible ; the utilisation of transmitting apparatus, by which the transmitted waves are generated by a direct sparking discharge in the antenna, especially, is only permissible in case of need. This latter arrangement of the transmitter may, however, be permitted in the case of certain special stations (as, for instance, on board small vessels), the primary energy of which does not exceed 50 watt.

(b) The speed of transmission and reception must be no less than twenty words a minute, the word to consist of five letters. New installations utilising an energy of more than 50 watt must be fitted in such a way as to make it easy to obtain more telegraph distances, smaller than the normal ones, the smallest of which should be about 15 nautical miles (equal about 28 km.). Old installations utilising an energy of more than 50 watt must be altered, if possible, so as to comply with the regulations mentioned above.

(c) The receiving apparatus, protected in the best possible way against disturbances, must be able to receive signals with the wave-lengths of up to 600 m., which are stipulated for the ship station.

(d) The primary energy of the station measured across the generator must under no circumstances exceed 1 k.w.

(e) Larger energy than 1 k.w. may, however, be utilised, if the ship is to interchange telegrams over a distance of more than 200 nautical miles (equal 370 km.) with the nearest station, or if communication, due to interference is not obtained unless by an increase of the transmitting energy.

(f) The station must be operated by one or more operators who have obtained certificates as specified below in Section 7.

The station must not be opened for communication until the telegraph department has issued a certificate, which will not be granted until the department, by inspection, is satisfied that the conditions set out in the licence granted by the Department of Public Works have been fulfilled.

II.—Installation, Service and Operation of Private Ship Stations.

4. The apparatus of ship stations must at any time be in strict accordance with the conditions set out in the licence for their establishment.

5. The hours of service of each coast station are decided by the Government Department.

As far as the hours of service of ship stations are concerned, these stations are divided into the following three classes :

(1) Stations with continuous hours of service ;

(2) Stations with limited hours of service ; and

(3) Stations with no fixed hours of service.

During navigation stations with continuous hours of service must be attended to constantly at the aural apparatus. In the case of stations with limited hours of service the aural apparatus must be attended to during all of the hours of service as well as during the first ten minutes of each hour not comprised in the normal hours of service. Stations with no fixed hours of service are not obliged to keep any regular watch over the aural apparatus.

The classification of a ship as regards the hours of service of same shall be stated in the licence.

6. Any ship station must be fitted to utilise wave-lengths of 600 m. and 300 m. respectively. The normal wave-length is 600 m. Small ships, may, however, be allowed to utilise wave-lengths of 300 m. ; but they must always be able to receive telegrams with a wave-length of 600 m. During the hours of service each ship station must be capable of being called with its normal wave-lengths.

Ship stations maintaining continuous watch and ship stations with limited hours of service shall be bound to have a radiotelegraphic spare installation, the single parts of which must be placed as safely as possible. This installation must have a source of energy of its own and must be capable of being put into use quickly, must be able to work satisfactorily for at least six hours and must have a minimal range of :

80 nautical miles (equal to about 150 km.) for ship stations belonging to the first class (maintaining continuous watch).

50 nautical miles (equal about 100 km.) for ship stations belonging to the second class (with limited hours of service.)

This special installation is not required in the case of ships, the normal installations of which comply with the requirements of spare installations mentioned above.

7. The service of the ship station must be maintained by operators who are in possession of certificates granted by the Department of Public Works.

In cases of urgent necessity and during one voyage only the service of a ship station may be undertaken by one or more operators holding a certificate from a foreign Government, which Government has joined the



MARCONI $1\frac{1}{2}$ K.W. TELEPHONE AND CONTINUOUS WAVE TELEGRAPH CABINET (OPEN), SHOWING TRANSMITTING AND RECEIVING VALVES.

[*To face page* 192

Internationa Convention concerning radiotelegraphs.

The certificate shall certify

Partly the ability of the operator:

(*a*) In the maintenance of the apparatus and knowledge of their working.

(*b*) In the sending and receiving (by sounding) of telegrams with a speed:

(1) No less than twenty words a minute for obtaining a certificate of first class, and

(2) No less than twelve words a minute for obtaining a certificate of second class.

(*c*) In the knowledge of the regulations utilised, governing radiotelegraph service.

Partly that the operator shall be bound to secrecy and subject to penalty, etc., for a breach of this condition as in the case of State telegraph operators.

Operators holding a certificate of second class may do service:

(*a*) On board ships utilising radiotelegraph in their own service or for the correspondence of the crew only.

(*b*) As assistant operators on board all ships having at least one operator holding a certificate of first class.

Ship stations with continuous service must be operated by at least two operators holding a certificate of first class.

The radiotelegraph service of the ship stations is placed direct under the master of the ship concerned.

In the event of a contravention of the regulations governing the operation of the radiotelegraph service, the certificate may be cancelled by the Department of Public Works.

No unauthorised person must be allowed to enter the wireless cabin.

8. If technically possible, ship stations must interchange telegrams with other stations (coast or ship stations), without regard to the system of radiotelegraphy employed at the station concerned. The interchange of telegrams with other ship stations must, however, be so arranged that the working of coast stations is not interfered with, these as a rule having the priority in public telegraph service.

The operation of a station must as far as possible be arranged so that it does not nterfere with other stations.

Exchange of superfluous signals and words is prohibited. Experiments and practice shall only be permitted in so far as the service of other stations is not interfered with; therefore, they must be executed with no other wave lengths than those utilised in the case of public telegram exchange, and utilising as little energy as possible.

When a ship is in a Danish harbour her station must only be utilised for communication with ships in distress.

9. According to the London Convention, the Telegraph Department must notify the Berne Bureau of the ship installation, and the Telegraph Department can demand to be furnished with any information regarding the installation, service, and working of a ship station, both for this and for other purposes.

10. The Telegraph Department will see that all conditions for the fitting and operation of ship stations are complied with. The inspectors for this purpose, who are selected by the Director of Telegraphs, must at any time on showing their authority be admitted to inspect and test the station, provided that the ship is within Danish waters. All information required by the said inspectors must be immediately given, and their directions must be complied with, pending the decision of the Director of Telegraphs, or, that of the Department of Public Works.

For the proper carrying out of the inspection the inspectors shall be paid a daily remuneration in addition to travelling expenses; such amount shall be paid by the Telegraph Department, but will have to be refunded (on demand) by the owners of the ship in question.

III.—Handling of Radiotelegrams.

11. Radiotelegraph stations open for public service for the transmission and reception of telegrams may be used by any person, unless the public telegram exchange at the station in question is limited to a certain special kind of telegrams (see section 14).

The telegrams are divided into three classes:

(1) State telegrams.
(2) Service telegrams.
(3) Private telegrams.

The right to transmit State telegrams and service telegrams, and the right to priority for such messages, is at any time governed by the provisions embodied in the International Telegraph Regulation and the Inland Telegraph Regulation governing the transmission of such telegrams over ordinary telegraph systems.

12. Regarding the radiotelegraph traffic, the handling of telegrams is governed by the International Radiotelegraph Service Regulation, Articles XIV–XV. XIX–XL, XLV–XLIX. The handling of telegrams to and from coast stations and over the ordinary telegraph and telephone system is at any time governed by the Inland and International regulations for such traffic.

13. State and service telegrams may under all conditions be written in code or cypher. Private telegrams in code or cypher may be interchanged only with coast stations of such countries where this method of communication is allowed.

14. The ship stations may be licensed for:

Ordinary public telegraph communication.

Limited public telegraph communication (with specified ships, with specified shipping lines, etc.).

Private telegraph communication.

Special telegraph communication (exclusively for State use, etc.).

In the public telegraph communication the following special radiotelegrams are to be received and handled:

(1) Radiotelegrams with prepaid reply.

(2) Radiotelegrams (collated telegrams).

(3) Radiotelegrams to be delivered by express messenger.

(4) Radiotelegrams to be delivered by post.

(5) Radiotelegrams with more addresses than one.

(6) Radiotelegrams with certificate of arrival. Certificates of arrival are handled on lines of telegraphs only.

(7) Paid service messages, except such as require a repetition or an information.

(8) Express telegrams, which are, however, only transmitted as such on the ordinary lines of telegraphs and under the proviso

that the prescriptions of the International Telegraph Regulations are followed.

All stations are bound to receive, answer, and, if possible, further to communicate messages from ships in distress and give these absolute priority.

Ship stations, however, have no responsibility whatever regarding the radiotelegraph communication.

Ship stations intended for public telegraph service shall get such printed forms, service journals, tariff lists, etc., as are necessary for this service, from the Telegraph Department against payment of fixed amounts. It is the duty of the station to take care that a sufficient supply of these things is always available. Such stations must furthermore be governed by all the instructions regarding the installation and operation of the station and the handling of the traffic issued by the Telegraph Department.

15. The abbreviations mentioned below covering the terms also mentioned below may be utilised; they are written between two double hyphens before the address, and are charged as one word:

Term	Abbreviation
To be delivered to addressee only	MP
Delivered open	Ouvert
Private express telegram	Urgent or D
x Addresses	TMx
Reply paid x	RPx
Urgent reply paid x	RPDx
Collation	TC
To be delivered per post	Poste
Télégraphe restant	TR
Poste restante	GP
Post registered	PR
Poste restant registered	GPR
Telegraphic certificate of arrival	PC
Telegraphic urgent certificate of arrival	PCD
Certificate of arrival by post	PCP
Express messenger	Expres
All addressed to be stated	CTA

16. The entire charge for radiotelegrams shall include:

(1) Charge for the radiotelegraphic handling, namely:

(*a*) "Coast fee," which shall devolve on the coast station.

(*b*) "Ship fee," which shall devolve on the ship station.

(*c*) "Transit fee," for the coast or ship stations being intermediary stations at the handling of the telegrams.

(2) Charge for handling over the ordinary telegraph and telephone system paid according to the general regulations

The coast fee for Danish coast stations shall be 15 ctm. per word.

The ship fee shall be fixed by the owner of the ship station, subject to the approval of the Department of Public Works. It must not exceed 40 ctm. per word; a minimum charge per telegram may, however, be adopted, not exceeding the charge for ten words. Service telegrams concerning telegrams handled exclusively per radiotelegraph are handled without any charge between the radiotelegraph stations, but are liable to charge when passing lines of telegraphs. Press telegrams at a reduced charge will not be received.

17. The entire charge for the handling of a radiotelegram from the sender to the addressee is to be collected from the sender by the station where it originates. The stations must not collect larger amounts than allowed in the tariffs.

18. All pecuniary liability in consequence of the operation of the ship stations is payable entirely by the owners of the ship in question, without regard to whether the liability in any case may have been due to fault or neglect on the part of the operators.

19. The original radiotelegrams with the vouchers pertaining thereto must, if possible, be sent once a month by the ship stations to the Telegraph Department.

20. Reimbursements of charges paid, and accounts with the Telegraph Department, are governed by the International Radiotelegraph Service Regulation, Articles XLI and XLII.

IV.—Other Regulations.

21. Stations on board ships under foreign flags must not be operated during the time such ships are in a Danish harbour, except to receive, answer and forward messages from ships in distress.

22. When the interests of the State require it, the Government may reserve to itself the right to prohibit all radiotelegraphic communications from ships, Danish or foreign, in Danish waters, and to make the necessary regulations to carry through such prohibition.

23. The maximum penalty payable to the State by the owners or radiotelegraphic company concerned for contravening the foregoing regulations is 400 kroner (£22), and all unlawfully fitted or utilised apparatus may be forfeited. Such contraventions are dealt with in the public police court, and proceedings may only be taken according to demand by the Minister for Public Works.

24. These regulations shall come into force on July 1st, 1913.

C. Regulations for the Erection and Working of Private Radiotelegraphs

(Experimental Stations; Instructional Stations; Stations to Receive Time Signals, Meteorological Reports, etc., etc.).

1. Licence to establish and operate private radiotelegraphs can only be granted to persons above eighteen years of age, who are Danish subjects and have their residence in Denmark. It is not to be expected that the licence, which cannot be transferred to or utilised by others except in accordance with the consent of the Telegraph Department, be granted, unless it is considered to be of actual value to the person concerned or the scientific or technical development of Wireless Telegraphy or Telephony.

Application for the licence drawn up in duplicate and provided with signature is to be sent to the Telegraph Department; same must contain exact information with regard to the full name, age, residence, previous training, present position, and occupation of the applicant, as well as whether he is a Danish subject or not. The applicant must state exactly the scientific, technical, practical or other purpose for which the erection of the station is intended; furthermore he must send in a diagram of connections for and a description of the projected station as well as particulars about the energy by which the station is intended to work; furthermore the name of the wireless land or ship station or stations with which the station of the applicant wants to communicate.

2. It is under no circumstances allowed to transmit telegrams or messages, unless such telegrams and messages have absolute reference

to the radiotelegraphic service of the station concerned.

Signals of distress or messages and inquiries concerning assistance or the like, occasioned by disasters at sea form, however, an exception from the above, the station being bound to receive and immediately retransmit such messages to the proper persons by means of its apparatus or in some other way.

3. Communication, experiments and the like, with other wireless stations outside Danish waters is not allowed unless the consent of the Telegraph Department has been previously obtained.

An application to that effect must contain the name, location and licensee of the foreign land or ship station or stations, with which communication is wanted. A licence, if such one be obtained, does not entitle to communication with other foreign stations than those mentioned in the licence.

4. Stations equipped with transmitters must by no means interfere with the radiotelegraphic communication of other land or ship stations or the public telegraph or telephone traffic. These stations will receive from the Telegraph Department a call signal of their own, and shall answer as soon as this call signal has been observed. Every transmission of signals shall be stopped the moment this is demanded radiotelegraphically or in another way by a Danish wireless land or ship station open to public communication.

5. No transmission of signals must take place until the station has convinced itself that no communication is taking place which might be interfered with by such transmission.

6. The station is liable to be a client of the local telephone net of the place, so that telephonic connection with it can be obtained quickly.

7. The licensee and those persons who are allowed to use the station out of actual instructional purposes must sign a declaration to the effect that they bind themselves to keep secret the contents of such wireless telegrams as might be brought to their knowledge through the wireless station.

These declarations shall be written on special forms, which latter are to be sent to the Telegraph Department duly filled in and signed.

8. In the case of stations equipped with transmitting apparatus, the licensee must be familiar with and strictly maintain the Regulations of the International Radiotelegraph Convention and the Service Regulations annexed thereto, in so far as these regulations have reference to the station concerned.

9. Stations equipped with both transmitting and receiving apparatus, which have not been expressly mentioned in the licence as experimental stations, must use in general no other wave-lengths than 200 metres and below. Should it turn out to be necessary—in order to obtain the purposes intended for the erection of the station—to use larger wave-lengths than the above mentioned, the station shall be exclusively worked by such wireless operators as are holders of a certificate of first or second class as prescribed according to the notification of the Department of Public Works of June 27th, 1913. The transmission of signals over wave-lengths from 600 to 1,800 metres inclusive will entail an immediate withdrawal of the licence.

10. The stations mentioned in Article 9 shall generally not use a larger primary energy than ½ kw. Should the utilisation of a larger energy than the above turn out to be necessary in order to obtain the purpose intended for the erection of the station, the working of same shall be undertaken by a trained wireless operator as mentioned in Article 9.

It is necessary that the primary energy of the station can be read from permanently installed meters.

The utilisation of transmitting apparatus by which the generation of the transmitted waves takes place by direct discharge of sparks in the antenna is not allowed.

11. Receiving stations, which shall receive nothing but signals (time signals, meteorological reports, and the like) shall be arranged in such a way as to be able to receive at most only two wave-lengths; they shall be arranged in such a way that the licensee can only vary the tuning very little from the wave-length or wave-lengths fixed, and the deviation from one wave-length must not exceed 5 per cent. up or down.

The receiving apparatus shall be inclosed in a case in such a way that it can be worked from the outside only by the handle of the tuning contrivance. The shifting of detector and telephone shall, however, take place without it being necessary to open the case, which is to be plumbed by an inspector from the Telegraph Department.

With the exception of the coupling of the detector and telephone, the remaining connections of the receiver—also the connections from the aerial net and water or earth—shall be carried out inside the plumbed case and made so immovable (by soldering together) that a change of the tuning beyond the permissible limits cannot take place.

Later couplings of connections or tuning arrangements are not allowed.

12. When the station is not used and cannot be called, the aerial net (the antenna) must be put direct to a good water or earth connection.

13. The station must not be used until it has been examined by an inspector from the Telegraph Department. If the examination has turned out to be favourable the licensee will receive from the Telegraph Department an information in writing to the effect that the station may be used. An amount of Kr. 10.00 is to be paid for the examination, together with the travelling expenses of the inspector. The amount is to be paid to the Telegraph Department as per bill.

14. Produced under the authority of the Telegraph Department it will be examined as often as is deemed necessary, whether or not the provisions prescribed for the utilisation of the station are maintained; in general this examination will take place once a year. The expenses in connection with this examination to be paid by the licensee in accordance with the same rules as are mentioned in Article 13.

15. The installations of the station shall satisfy the provisions being at any time in force for the establishment of similar electric plants, and the necessary notices of warning shall be placarded on all places accessible to strangers. When the plant of a station undergoes a change of some importance, this shall immediately be brought to the knowledge of the Telegraph Department.

16. It is exclusively incumbent on the licensee to pay any damage caused by the

plant of the station (apparatus and aerial net) to a person or his property.

17. The conditions prescribed for obtaining a licence to establish and work a station can at any time be supplemented and changed should circumstances make it necessary.

18. The licence to work a station can be withdrawn at any time and without notice. This will always happen, in case the above conditions for obtaining a licence be not strictly maintained, and the licensee has no right to claim any compensation for the withdrawal of the licence. If the licence be withdrawn the licensee shall—under penalty pursuant to Act No. 99 of April 19th, 1907, section 6—immediately remove all of the apparatus and antennæ of the station.

Every abuse of the station, every transmission of false signals, or the fact that strangers gain admittance to use the transmitting apparatus of the station, will entail a withdrawal of the licence granted. In such case the offender might even be liable to penalty.

THE TELEGRAPH DEPARTMENT.

August, 1914.

DOMINICA (B.W.I.)

(See LEEWARD ISLANDS.)

DOMINICAN REPUBLIC

(See SANTO DOMINGO.)

DUTCH EAST INDIES

(See NETHERLANDS.)

EAST AFRICAN PROTECTORATE

THE territory covered under the above title extends from the Umba to the Juba River, and inland as far as the borders of Uganda. It includes certain mainland dominions of the Sultan of Zanzibar, these territories having been leased to Great Britain for an annual rent.

The Administration is conducted by a Governor and Commander-in-Chief, assisted by an Executive and a Legislative Council.

CONTROL.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
J. Gosling	Postmaster-General	Nairobi
H. J. W. Ridley	Assistant Telegraph Engineer	Do.
L. E. Caine	Chief Telegraph Engineer	Do.
J. K. Creighton	Telephone Engineer	Do.
G. F. Ball	Wireless Telegraph Engineer	Do.
A. Kane	Do. do.	Do.
J. Gornall	Do. do.	Do.
G. E. Hughes	Do. do.	Do.

ORGANISATION.

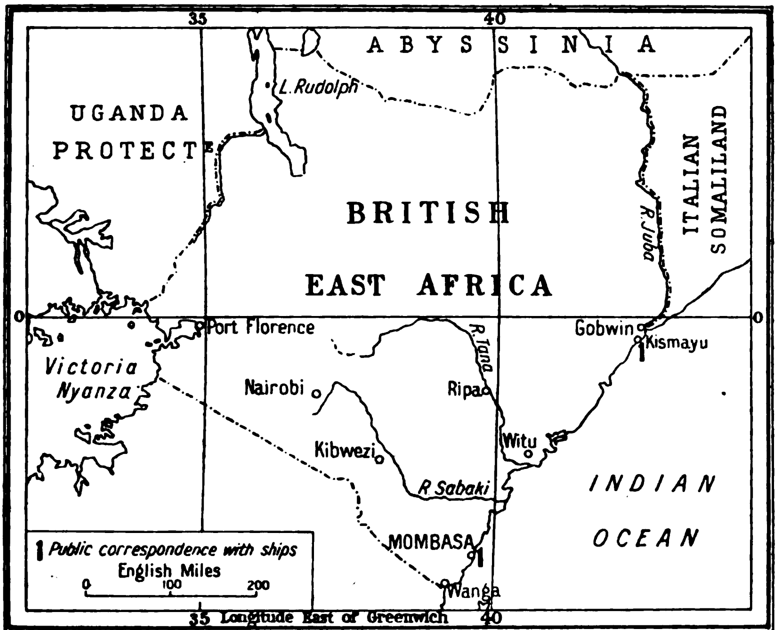
At present there are two radio stations open for public traffic in the Protectorate—one at Mombasa and the other at Kismayu, in Jubaland, and the construction of another station is contemplated.

The Mombasa station is equipped with a 5 kilowatt synchronised spark, with a spark frequency of 600 per second. The note emitted is pure musical and somewhat high. This plant is only used when the state of the atmosphere will not permit the small plant to be used, the particulars of which are as follows:—

A 1½ kilowatt synchronous direct-coupled plant capable of transmitting to ships a distance of 350 nautical miles. The usual frequency of the discharger is 750 per second, which has been found to give the best results in this locality.

The Kismayu station is equipped with a 3 kilowatt synchronous spark set having a spark frequency of 600 per second.

A radio service is maintained with Mombasa as a means of communication with Jubaland.



At present there are no private or experimental stations in the Protectorate, neither have any licences been issued for ship stations registered in the Protectorate.

ADMINISTRATION.

Radiotelegraphy is administered under the following :—

WIRELESS TELEGRAPHY ORDINANCE, 1913.

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by the Indian Telegraph Act, 1883, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

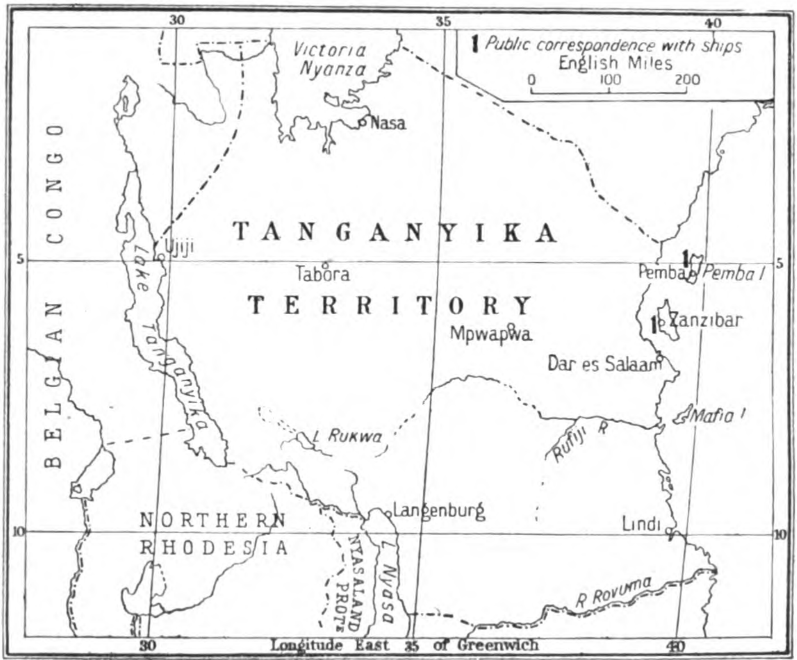
3. The Governor may, whenever he shall deem it expedient to do so, license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Protectorate or on board any British ship registered in the Protectorate except under and in accordance with a license granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand and five hundred rupees or to imprisonment of either description for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Attorney-General.

(2) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place, or ship,



and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor may make regulations for all or any of the following matters :—

(i.) for prescribing the form and manner in which applications for licences under this Ordinance are to be made ;

(ii.) for prescribing the fees payable on the grant of any licence ;

(iii.) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Protectorate shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Protectorate or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea ;

(iv.) for prohibiting, except with the special or general permission of the Postmaster-General of the Protectorate, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Protectorate ;

(v.) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Protectorate, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (iii.) (iv.) and (v.) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions, and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine of seven hundred and fifty rupees.

(2) All convictions, forfeitures, and fines under this Ordinance or any Regulations thereunder may be had and recovered before a Magistrate of the first class, and every such Magistrate shall have jurisdiction to pass any sentence authorised by this Ordinance on any European or other Non-Native convicted of an offence against this Ordinance notwithstanding

anything in any Ordinance or law limiting the jurisdiction of such Magistrate over Europeans and Non-Natives.

9. The Wireless Telegraph Ordinance, 1908, is hereby repealed: Provided however—

(1) Every licence granted under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been granted under this Ordinance.

(2) All Regulations made under the said Ordinance and in force at the commencement of this Ordinance shall be deemed to have been made under this Ordinance and shall continue in force until other provision is made.

ECUADOR

THE Republic of Ecuador comprises the provinces which formed the ancient Presidency of Quito, the Colon Archipelago (Galapagos Islands) and the so-called Orient Territory. The fifteen provinces have a total area of 55,000 square miles, that of the archipelago being 2,900 square miles. The Orient Territory is largely unexplored, and its boundaries are in dispute. Its inclusion makes the total area of Ecuador anywhere between 160,000 and 270,000 square miles. No complete census has ever been taken, but it is estimated that the present population of Ecuador is about 2,000,000.

The Government of Ecuador, according to the Political Constitution of 1830, is republican, representative and democratic. It is composed of the Legislature, the Executive and the Judicature. The Legislature, or National Congress, comprises the Senate and the Chamber of Deputies. The Executive is wielded by the President of the Republic, who is elected by popular vote every four years, and who is responsible for the appointment of the Ministers of State, Governors of Provinces, etc. The Judicature is exercised by the Supreme Court, High Courts, and other tribunals established according to the Constitution.

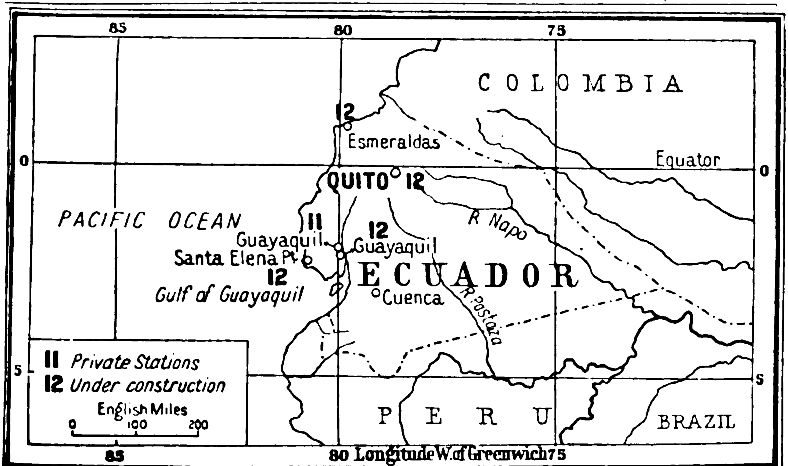
CONTROL AND ORGANISATION..

Up to the present there has been no legislation affecting wireless telegraphy. There is consequently no Government control over the installation of wireless stations, provided that no commercial service is carried on. The latter is the prerogative of the State.

Officers and men in the Guayaquil artillery school are put through a comprehensive course in radiotelegraphy with the aid of laboratory apparatus.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Dr. Don Carlos Tobar y Borgoño ..	Minister for Foreign Affairs	Quito
Señor Don Guillermo Destruge ..	Director-General of Telegraphs	Do.



The first wireless telegraph station was installed in 1913 at Guayaquil by Señor Don Geo. Chambers Vivero, Captain of the Port, for the purpose of communicating with vessels navigating in the Guayaquil River. It has a range of about 80 miles. The Marconi Company has recently completed a station at Santa Elena Point having a range of over 500 miles.

Further preliminary work is being carried out for two 10 kilowatt stations and one 5 kilowatt station. The two 10 kilowatt stations are being placed at Quito and Guayaquil; the 5 kilowatt station will be installed shortly at Esmeraldas. The antennæ will be of the umbrella type of a hundred metres. The transmission waves will be of 1,800 metres, in order to facilitate communication across the mountains, but the stations which will be installed afterwards will work with a 600-metre wave for communication with ships.

The Marconi Company has a 5 kilowatt station which is not yet in the public service, but which will shortly be utilised, by virtue of an agreement which it is hoped will be concluded shortly.

At present these stations are merely strategical, and for the Navy. In view, however, of the progress made by wireless telegraphy, as regards reliability and speed, work is proceeding in the direction of creating a permanent interior system, which, having regard to the mountainous nature and small population of the country, shall ensure a continuous service which will advantageously and economically supplement the present wire telegraph system, which is always so liable to accidents, with consequent paralysis of traffic.

Furthermore, aviation, which sooner or later will become more general, demands that an efficient wireless system shall be created for the rapid transmission of meteorological information in all parts of the country. The progress of aviation is bound up with that of wireless telegraphy.

Communication is projected between the Galápagos Islands and the continent. A station will be placed at a point on the coast which shall permit of exterior communication. All these matters are receiving consideration and the hope is felt that they will be realised.

The stations of Quito and Guayaquil will be adapted for a system which is capable of effecting an efficient and permanent service, as apparatus exists which has recently been tested and found adequate to ensure this class of permanent service, notwithstanding the difficulties of territory and atmosphere; these questions are of great importance in view of the geographical position of the country.

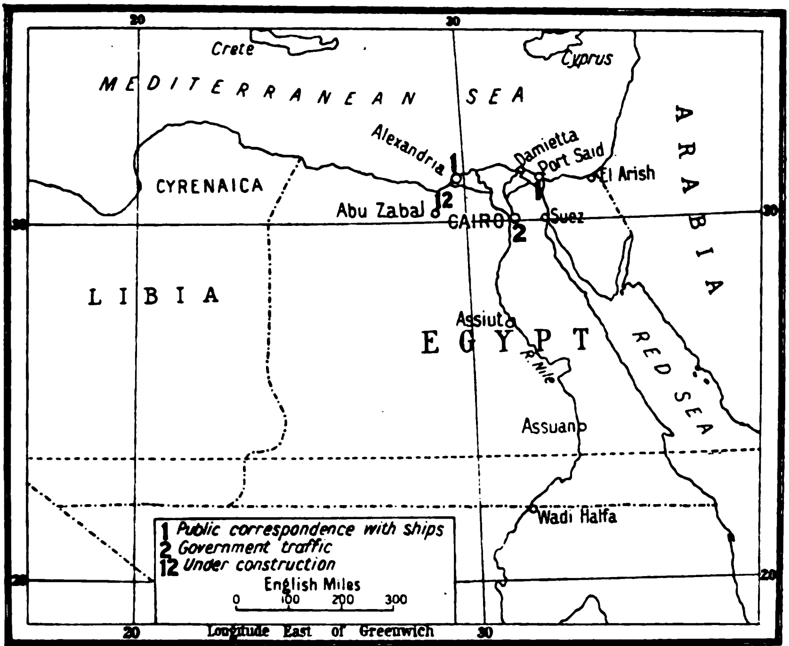
As the traffic develops, small stations will be established in towns of lesser importance.

The question of wireless telegraphy in Ecuador is receiving consideration from the technical and economical points of view; that is to say, due account will be taken of the country's requirements and resources. With regard to all these questions, the wave systems will have to be considered. At certain points the service will be performed by the use of the damped wave and some stations will be transformed to work with both classes of wave. For example, a coast station will have to work not only with ships but also with all the stations in the interior of the country. Further, the simultaneous working of all stations demands a variety of system between them all, and this will call for the most rigid organisation.

The present state of wireless telegraphy will enable all this to be realised, and in the future communication will be effected by this means with the most distant points.

EGYPT

KNOWN by the Arabic-speaking peoples of the world as "Masr," Egypt was proclaimed a British Protectorate on December 18th, 1914, shortly after the declaration of war on Turkey. The inhabited portion of the country is practically wholly comprised within the valley of the Nile and its Delta, a few nomadic tribes living in the large desert wastes lying to the west and



east of that remarkable river. The cultivable area of Egypt is computed at about 8,006,000 feddans (a feddan is a little more than an acre). Egypt enshrines within her those mighty remnants of a long-forgotten past when Thebes found herself the centre of civilisation and the great mythical god Amen-Ra accepted the worship and oblations of many thousands who gave him allegiance.

CONTROL AND ADMINISTRATION.

Wireless Telegraphy in Egypt forms a branch of the Ministry of Communications and is controlled by the State Telegraph Department of that Ministry. According to the latest statistics the following is the position in regard to land stations :—

Public service to ships	3
Government traffic only	1
Under construction	1

Wireless Telegraphy is a State monopoly in accordance with the following Khedivial Decree dated May 12th, 1906 :—

1. Wireless Telegraphy shall be a State monopoly and no installation shall be established or used except by the Government or with the sanction of the Government.

2. The Minister of Public Works shall be responsible for administration of this law.

ERYTREA

(See Italy.)

FALKLAND ISLANDS

THIS is a Crown Colony situated in the South Atlantic, 300 miles east of the Magellan Straits. The area covers 6,500 square miles, besides South Georgia, 1,000 square miles (estimated), and there are several dependencies —*e.g.*, the South Shetlands, South Orkneys, Sandwich Group, and Graham's Land.

The Administration is conducted by the Governor, assisted by an Executive Council and a Legislative Council. There are two stations conducting public correspondence with ships.

ADMINISTRATION.

Radiotelegraphy is administered under the following Act :—

WIRELESS ORDINANCE.

DATED MARCH 15TH, 1912.

The following Ordinance relating to wireless telegraphy came into force on March 15th, 1912:

1. No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor in Council.

2. No person shall work any apparatus for wireless telegraphy installed on any merchant ship (whether British or foreign) whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor in Council, and the Governor in Council may, by any such regulations, impose penalties, recoverable before a Stipendiary Magistrate or any two Justices of the Peace in a summary manner, for the breach of any such regulations, not exceeding twenty pounds for each offence, and may provide for the forfeiture of any such breach of any apparatus for wireless telegraphy installed or worked on such ship.

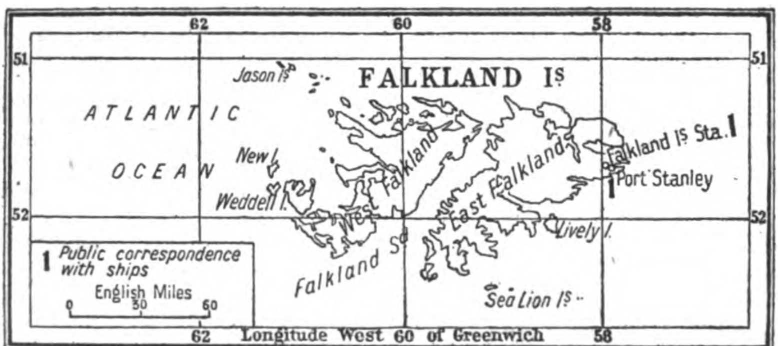
3. If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be guilty of a misdemeanour and be liable on summary conviction thereof to a penalty not exceeding twenty pounds or to imprisonment not exceeding three months and, on conviction in the Supreme Court, to a fine not exceeding one hundred pounds, or to imprisonment for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence.

4. If a Justice of the Peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship within his jurisdiction without a licence in that behalf or contrary to the provisions of the regulations made under this Ordinance, he may grant a search warrant to any constable or to any officer appointed in that behalf by the Governor and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place, or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy.

5. The expression "wireless telegraphy" means any communication by telegraphy without the aid of any wire connecting the points from and at which the messages or other communications are sent and received; Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

6. The Wireless Telegraph Ordinance, 1903, is hereby repealed.

7. This Ordinance may be cited as the Wireless Telegraph Ordinance, 1912.



FIJI ISLANDS

(See map on p. 334.)

ABOUT 1,100 miles north of New Zealand lie some 200 to 250 islands (a few merely bare and uninhabited), which cover a square of the South Pacific Ocean about 300 miles each way and constitute the British Colony of Fiji. Their latitude lies from 15° 45′ to 21° 10′ south; whilst their longitude stretches from 176° 0′ east to 178° 0′ west. The gross area of the group amounts to about 7,435 square miles.

The administration is that of a British Crown Colony, the Governor being assisted by an Executive Council of six and a Legislative Council of twenty members.

CONTROL.

The four wireless telegraph stations in Fiji are owned and worked by the Colonial Government through the department of Telegraphs and Telephones.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
C. C. F. Monckton, M.I.E.E. ..	Superintendent of Telegraphs and Telephones	Fiji
W. G. Covell, A.M.I.E.E.	Assistant Engineer	Fiji
W. Kearsley R. C. Farquhar H. Roffey K. Lawry	Wireless Operators in charge of Stations	—
J. R. Land A. O. Barrack K. W. A. Black F. Thomas	Assistant Wireless Operators ..	—
T. J. Davis	Accountant	Fiji

Stations.—Suvaradio, Labasaradio, Taviuniradio, and Savusavuradio.

There are no privately owned experimental or amateur stations in the Colony, neither are there any ship stations licensed in Fiji. The Colony contains no wireless clubs or societies.

ORGANISATION.

The first Wireless Telegraph Ordinance was passed in 1903. This was revoked by Ordinance No. XXV. of 1912 (printed in the YEAR BOOK for 1917), which was in turn revoked by Ordinance V. of 1913. New regulations were made in 1917, which have since been revoked, and the original regulations made in 1913 are now in force.

No licences for wireless telegraph working have been issued since 1914.

There are no stations existing or projected for aviation or meteorological purposes.

ADMINISTRATION.

The following pages contain the text of :—

A—Ordinance No. V. of 1913.
B—Schedule based thereon.

AN ORDINANCE TO PROVIDE FOR THE REGULATION OF WIRELESS TELEGRAPHY.

Dated June 19th, 1913.

A Be it enacted by the Governor with the advice and consent of the Legislative Council as follows :—

1. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1913.

2. In this Ordinance " wireless telegraphy " means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received : Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under or in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such purpose as the Governor may determine and shall contain the terms conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship whether British or foreign while that ship is in the territorial waters of the Colony otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have

control over the transmission of messages by wireless telegraphy the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a stipendiary magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance he may grant a search warrant to any officer of constabulary or any person appointed in that behalf by the Inspector-General of Constabulary and named in the warrant and a warrant so granted shall authorise the officer of constabulary or person named therein to enter and inspect the station place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds and upon such conviction the court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before a stipendiary magistrate on the complaint of the Inspector-General of Constabulary or of any person thereto authorised by him in writing and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraphy Ordinance 1912 is hereby repealed.

Passed in Council this twenty-sixth day of May in the year of our Lord one thousand nine hundred and thirteen.

SCHEDULE.

Regulations.

B (i.) All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with :—

(*a*) Naval signalling ; or

(*b*) the working of any wireless telegraph station lawfully established installed or worked in the Colony or the territorial waters thereof and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(ii.) In these regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station whether on shore or on any ship.

(iii.) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

(iv.) For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(v.) Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

(vi.) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

FINLAND

THIS unfortunate country is still in far too unsettled a state for us to be able to obtain the text of any laws and regulations which may exist in regard to wireless telegraphy, but we hope by the time our next edition is in course of preparation that normal conditions will be sufficiently re-established to enable our doing so.

As far as can be ascertained now, there is a wireless station under construction at some point within the territory.

FORMOSA

(See Japan.)

FRANCE

(Including Algeria and Tunis.)

FRANCE is the most westerly of Central European countries. In latitude it lies between 40° 29′ and 51° 5′ N. ; in longitude between 7° 45′ E. and 4° 45′ W. The area of its 87 departments (including the Isle of Corsica) is estimated at 207,076 square miles.

Its colonial possessions (including Algeria and Morocco) cover a total

area of 4,084,410 square miles. Of these Algeria (French since 1830) is reckoned as an integral part of France, the rest being governed as protectorates. Tunis has been a French Protectorate since 1881. The area of French Africa alone is reckoned at 3,812,000 square miles.

CONTROL.

Radiotelegraphy in France is a State monopoly.

The commercial use of wireless telegraphy in France, Algeria and Tunis has been placed under the control of the Minister of Commerce, Industry, Agriculture, Labour, Posts and Telegraphs. The Department of Telegraphs deals with all matters relating to the administration of commercial wireless telegraphy, and this Department also controls inland and foreign telegraphs. The Ministry of War and the Ministry of Marine control the use of wireless telegraphy in the Army and Navy.

With regard to the other French Colonies, the service in each is organised under a decree of the respective Governors of those Colonies.

Through the courtesy of the French Government we are able to append a general note affecting radiotelegraphy in these Colonies, which will be found at the end of this section.

The latest statistics as to the number of stations in France and Colonies are :—

France.	
Public service to ships	8
Government traffic only	13
Direction-finding service	8
Private traffic	1
Under construction	1
French Equatorial Africa.	
Public service to ships	1
Under construction	2
French Guiana.	
Under construction	1
French West Africa.	
Public service to ships	4
Inland service	3
Under construction	2
Madagascar.	
Under Construction	4
Tonquin.	
Under Construction	6
Cochin-China.	
Under Construction	2

ORGANISATION.

Licences for the erection and maintenance of ship stations are issued to steamship companies. The form of such licences and the contract indicating the conditions under which is accorded authorisation to instal wireless telegraphy on board ships will be found below.

ADMINISTRATION.

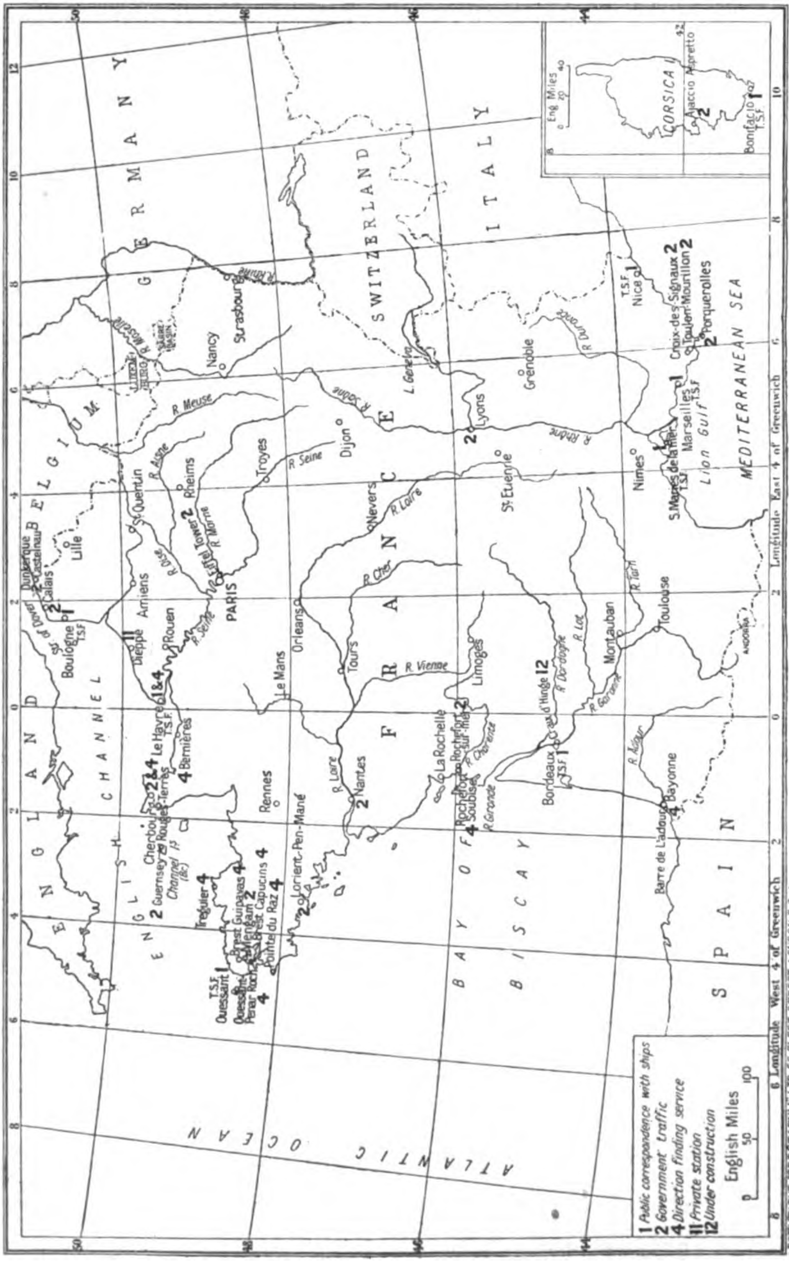
The administration of radiotelegraphy is governed by two principal enactments (which took the place of those dated February 7th, 1903, and February 27th, 1904, respectively) supplemented by a Form of Ship's Licence, and there have been no recent changes in the Laws and Regulations relating to wireless telegraphy.

The Enactments above referred to consist of :—

A.—Decree dated March 5th, 1907 (modified by subsequent enactments).

B.—Decree dated February 24th, 1917, the text of which will be found below.

C.—Form of Ship's Licence.


1 Public correspondence with ships
2 Government traffic
4 Direction finding service
11 Private station
12 Under construction
English Miles
COPYRIGHT "GEOGRAPHIA" LTD 55 FLEET STREET LONDON E C 4
F R A N C E
ENGLISH CHANNEL
BAY OF BISCAY
MEDITERRANEAN SEA
ATLANTIC OCEAN
S P A I N
I T A L Y
SWITZERLAND
G E R M A N Y
B E L G I U M
E N G L A N D
CORSICA
PARIS

A The following are the principal clauses of the Decree dated March 5th, 1907 (modified by the following decrees: April 26th, 1910; February 5th, 1911; May 27th, 1911; November 20th, 1911), which superseded the decrees of February, 1903, and February 27th, 1904:—

1. Radiotelegraphic stations established or about to be established in France, Algeria and Tunis shall be classified as follows:—

(*a*) Coast or internal land stations for carrying on commercial service.
(*b*) Naval coast stations.
(*c*) Military coast stations.
(*d*) Lighthouse or lightship stations.

In addition, private stations may be established temporarily when the necessary licences have been obtained.

2. The President of the Council, the Ministries of the Interior, of Public Works, Posts and Telegraphs, of War, Marine, Colonies, Foreign Affairs, Commerce and Industry, Public Instruction and Fine Arts are charged, in so far as concerns their respective departments, with the carrying out of this Decree.

In case of mobilisation the Ministries of Marine and War shall automatically assume control of all stations, without exception.

3. The choice of sites for the proposed range of a station and all technical conditions applicable to each projected station shall be submitted for the consideration of an Interministerial Commission formed in accordance with Article 4 of this Decree. The function of this Commission is to study the various aspects of the services to be carried on and to indicate to the Administrative Departments affected the conditions that are necessary to reconcile their respective interests.

4. The Inter ministerial Technical Commission shall be appointed by the Minister of Public Works, Posts and Telegraphs, and shall comprise the following members:—

One President and one Vice-President appointed by Presidential decree from the Departments interested.

Three representatives from the Ministry of Marine.

Three representatives from the Ministry of War.

Two representatives from the Colonial Office.

Two representatives from the Foreign Office.

Two representatives from the Ministry of Commerce and Industry.

Two representatives from the Ministry of Public Instruction and Fine Arts.

One representative from the Ministry of the Interior.

Four representatives from the Ministry of Public Works, Posts and Telegraphs, one representing the Department of Public Works and three the Post and Telegraph Administration.

A secretary who shall belong to the Post and Telegraph Administration. He shall have no voting powers.

5. The Commission shall examine the title to sites and technical conditions appertaining to all stations which shall constitute the French radiotelegraphic network; examine complaints regarding French stations; consider such administrative problems concerning the radiotelegraphic service as the Ministry of Public Works, Posts and Telegraphs deems fit to submit to it; institute experiments of general interest. The Commission shall be informed through the departments represented thereon of results obtained by various types of apparatus employed at stations in operation.

6. Except during periods of mobilisation all radiotelegraphic coast stations and stations carrying on commercial services, other than those which exist solely for experimental purposes, shall be open for the transmission of private telegrams.

7. The Post and Telegraph Administration shall be responsible for all matters concerning the collection and taxes, foreign stations, and the International Bureau at Berne. It shall supervise the administration of international regulations in so far as they concern commercial traffic passing through coast stations in France, Algeria and Tunis, as well as through stations on vessels of the mercantile marine.

8. Licences to establish private stations shall be granted by the Post and Telegraph Administration upon the recommendation of the Commission referred to in Article 4. Such licences shall only be of a temporary character, and the stations are strictly forbidden to interfere with the working of other stations.

B Decree of February 24th, 1917, relating to the reception and transmission of radiotelegraphic signals.

ART. 1. Private individuals and corporations are forbidden to establish or make use of telegraphic machinery, or apparatus, or any fitments whatsoever capable of transmitting or receiving signals, without the express authorisation of the Minister of Commerce, Industry, Agriculture, Labour, Posts and Telegraphs either on French territory or above that territory, or on board French vessels.

The employment on board foreign vessels in French territorial waters of wireless apparatus or installations, is forbidden, except in conformity with the rules laid down by the French Government for the employment of such apparatus and installations in the aforesaid territorial waters.

ART. 2. Authorisation for the establishment of a transmitting radiotelegraphic station is only granted to private individuals, or corporations, under the proviso that no let or hindrance shall be able to arise therefrom to the detriment of the working of public stations. The Minister, whenever he shall think fit to authorise (after consultation with the Ministers of War and Marine) the establishment of any proposed station, shall lay down the conditions under which that station shall be erected and worked.

ART. 3. Receiving wireless stations require the same authorisation, under the same conditions as transmitting stations.

It is understood, however, that stations destined for the reception of time and weather signals, whose erection is sought by French citizens, may receive due authorisation by the head of the local Postal and Telegraphic Service (when the latter is asked to do so by the parties interested) under the conditions laid down by a Decree of the Minister for Commerce, Industry, Agriculture, Labour, Posts and Telegraphs (after consultation with the Ministers of War and Marine). Special measures may be carried out under the authority of the Ministers of War and Marine in view of the concession in favour of stations of the kind above-mentioned in certain stated districts.

ART. 4. The royalties due from those who have been granted leave to erect stations are fixed by the Minister of Commerce, Industry, Agriculture, Labour, Posts and Telegraphs and worked in consultation with the Minister of Finance.

Stations for the reception of time and weather signals shall be only liable to payment of a fixed royalty of five francs per year per station.

ART. 5.—In times of war—

(*a*) All private wireless stations, with the exception of those used by, or on behalf of, military authorities must be dismantled. The owners of such stations must remove the antennæ, and deposit the essential parts of their sending and receiving apparatus in places designated for that purpose by the Postal and Telegraphic authorities.

(*b*) The antennæ of wireless stations of mercantile vessels must be dismantled during the whole of the stay of such vessels in French ports and/or territorial waters, unless they have received special authorisation not to do so from the Naval Authority. Moreover, the Marconi Cabin must be locked up and the key placed in the hands of the master of the vessel. No work (either in the way of overhaul, repair, etc.) may be executed unless the aforementioned officer has assured himself that the work is being carried out by persons authorised to do so.

(*c*) It is within the option of the Minister of Commerce, Industry, Agriculture, Labour, Posts and Telegraphs (acting after consultation with the Minister of War and Marine), to prohibit for the time being all manufacture, vending or sale of radio-telegraphic apparatus, except under special licence.

ART. 6.—The rules laid down under Chapter V. of the Decree-Law dated December 27th, 1851, are applicable to the conditions laid down by the present Decree.

In times of war any representative of the Minister of War, or the Minister of Marine shall be qualified equally with the Minister himself to institute the proceedings provided for in Art. 10 of the aforesaid Decree-Law.

Moreover, in times of war the War Office and Admiralty shall also have power to take the provisionary measures laid down in Art. 12 of the Decree-Law of December 27th, 1851, if in their opinion such measures are matters of urgency.

Statements drawn up by officers of the French Forces, either on land or sea, shall not require to be taken on oath. They are to be viewed as absolutely reliable unless the contrary shall have been proven.

FORM OF SHIP'S LICENCE.

C

FRENCH REPUBLIC.

MINISTRY OF COMMERCE AND INDUSTRY, POSTS AND TELEGRAPHS.

Office of Control, Telegraphic Administration

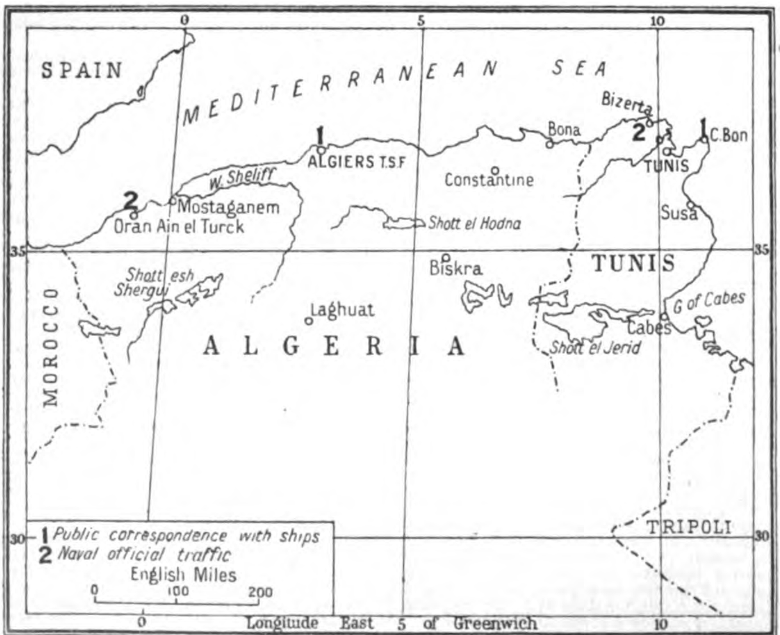
Licence delivered in accordance with Article IX. of the International Radiotelegraphic Convention Service Regulations.

In consideration of the undertaking given by the applicant and the particulars furnished by...................

And in consideration of the arrangements under the Convention and the Radiotelegraphic Regulations as codified in London on the 5th July, 1913; and especially of Articles III., VII., VIII., X., XI., XIII., and XVI. of the aforesaid Regulations.

And in consideration of the report supplied by the Engineer-in-Charge of the Radiotelegraphic Service following on his visit to the station on board ....

Authorisation is hereto given for the instalment and maintenance of the radiotelegraphic station on board the .... which is scheduled under Class ....





The present licence is available for as long as the Radiotelegraphic Convention and Regulations of London remain in force.

Given in Paris on the .... day of ....

(Signed) on behalf of the Minister of Commerce, Industry, Posts and Telegraphs by

....

Chief of the Telegraphic Administration.

UNDERTAKING

GIVEN BY ....

Who in consideration of an authorisation to instal and maintain a wireless telegraph station on board the s.s. .... declares himself willing to submit, without reserve, to the clauses and conditions of the agreement whereof the text is herewith subjoined, with the object of obtaining such authorisation for utilising a wireless station on board the s.s. ....

ART. 1.—The installation of the proposed wireless station shall be submitted to the preliminary approval of the Administration of Posts and Telegraphs. Only apparatus manufactured in France, from materials supplied by builders or manufacturers having their workshops in France, can be employed in the construction of this radiotelegraphic station.

The average range of the station shall b. ....

In the event of its being recognised—in consequence of improvements carried out in radiotelegraphy (affecting range, syntony, wave direction, etc.)—that important modifications can be adopted in the ship's station, the Administration of Posts and Telegraphs reserves to itself the right of providing for the adoption of such improvements.

Every subsequent alteration made to the station must be notified to the Administration of Posts and Telegraphs and receive official approval before its inception.

ART. 2.—............ shall take every care necessary to ensure that the installation, maintenance, and usage of the station, as well as any modifications introduced in accordance with the preceding article, shall be carried out without involving any expense to the Administration of Posts and Telegraphs.

ART. 3.—All contracts, agreements, etc., which have been entered into, or which shall in the future be entered into, between .... and the manufacturers of wireless apparatus, or which have been or shall be made with wireless companies, for the construction and maintenance of the station, shall—before being put into effect—be submitted for the approval of the Administration of Posts and Telegraphs.

ART. 4.—A charge in favour of the ship's station may be levied on the aforementioned vessel; its amount being fixed by the Administration of Posts and Telegraphs in agreement with .... This charge shall not be made on official communications of the French Republic.

.... shall be liable to be called upon to place in an office of the Posts and Telegraphs a deposit, by way of guarantee for the charges received on board, and for which he is accountable to the Administration of Posts and Telegraphs.

In the event of the administration of the authorised station being granted to a company, ... shall remain responsible for the charges received on board.

ART. 5.—All telegraphists entrusted with the manipulation of apparatus must be of

French nationality, and subject to the approval of the Administration of Posts and Telegraphs.

ART. 6.—The contents of telegrams transmitted by wireless, which reach the ship's station without being intended for ...., shall not be divulged to any one whatsoever outside the officials appointed by the Administration of Posts and Telegraphs, or the competent officers of judicial police. No use whatsoever may be made thereof.

ART. 7.—The Administration of Posts and Telegraphs may, if it seems good to them, demand at any moment, and on immediate requisition, that the station on board shall be temporarily, or permanently, taken over by State officials. These officials shall be accommodated on board in the class corresponding to their grade. Their messing may be charged for, but not their transport. In such cases the Administration of Posts and Telegraphs shall render account to .... for the board ship charges due to him after making deduction of cost of upkeep of the station.

In the event of the Administration of Posts and Telegraphs deciding to apply the foregoing provision they may employ wireless telegraphic apparatus of a different type to that utilised by .... They reserve, moreover, the right, in case of need, of placing such apparatus on board in advance.

ART. 8.—The Administration of Posts and Telegraphs shall exercise in the manner which seems best to them their right of control over the authorised ship's station (installation, transmission, and reception of radiograms, rendering of accounts, etc.).

ART. 9.—The date of the initiation of the service of the ship's station shall be fixed by agreement with the Administration of Posts and Telegraphs.

After the establishment of the installation the apparatus cannot be removed without the express consent in writing of the Administration of Posts and Telegraphs. The apparatus must be continuously maintained ready for use, and .... must give fifteen days' notice in advance to the Administration of Posts and Telegraphs in the event of his desiring for any reason to cease to use the station.

In the event of the ship's sale, ... must advise the Administration of Posts and Telegraphs, informing them at the same time of the name and address of the new owner, as well of the arrangements which may have been made (should there be any such) for the closing of the station.

In any event, the aforesaid station cannot be closed down without the express consent in writing of the Administration of Posts and Telegraphs, and the holder of this licence shall remain responsible for the charges due until authorisation for transfer has been received.

ART. 10.—The licence granted to .... applies only to the vessel mentioned above. A new licence would be necessary, should .... decide to instal a radiotelegraphic station on any other of his ships.

This licence can, moreover, be suspended or revoked at any time, and for any reason, without any liability on the part of the Administration of Posts and Telegraphs to pay any indemnity whatsoever, and without any obligation to state the reasons for their decision.

In particular, the licence may be revoked in the event of failure by .... to observe the provisions of the present agreement.

ART. 11.—............ declares that he subscribes to all the legislative arrangements and rules established, or that shall in the future be established, in France with regard to internal and international wireless service.

The wireless station which forms the subject of this licence shall exchange radiotelegrams with all the coast or ship stations within the sphere of action of which it shall come without any distinction of the radiotelegraphic system adopted by these stations.

ART. 12.—The State shall not be subject to any responsibility through difficulties which may arise between .... and private individuals, companies or corporations, to whom authorisation for carrying on wireless telegraph stations may have been granted; or in general with anyone soever or for any reason.

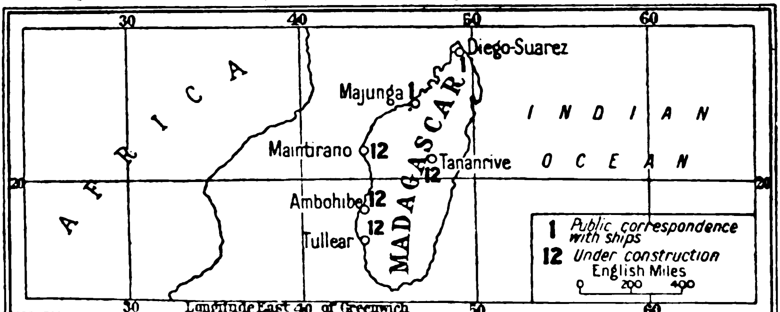
ART. 13.—The stamp duties appertaining to the present licence are payable by ....

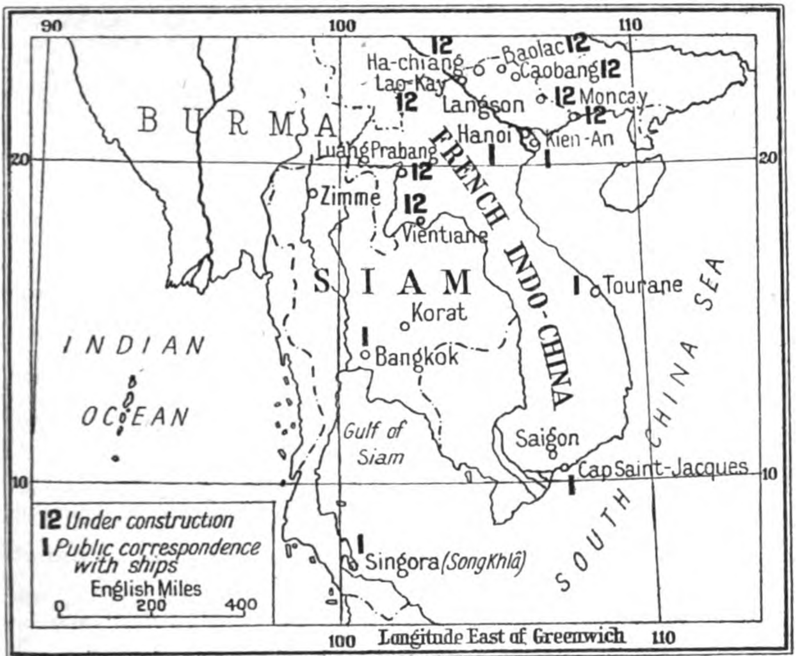
Given on .... the .... day of ....

Colonies of France

(*Not* including Algeria and Tunis.)

The local systems of these Colonies are organised and regulated by their Governor-Generals and the other Administrators affected. Co-ordination in working is secured through the intermediary of the French Colonial Office





(Secretarial and Counter-Signatory Departments), to which is attached a Special Committee, entitled the Colonial Committee of Radiotelegraphy, whose business it is to advise on all matters of general concern.

Since the beginning of the late war the French Colonies have instituted a number of radio stations, which include the following :—

PAPEETE (Tahiti, South Pacific), which communicates with ships, and with New Zealand and the Samoan Islands. (See map on p. 334.)

NOUMEA (New Caledonia), which communicates with ships, and ultimately to Australia. (See map on p. 334.)

TOURANE (Annam), for ships' communication. (See above map.)

MUTSAMUDU (Madagascar), for ships' communication and for communication with Mayotte Island.

FORT DE FRANCE (Martinique), for communication with ships, and ultimately to Demerara. (See map on p. 295.)

PORT-VILA (New Hebrides), a joint-station with the British Government under the Condominium, for communication with ships and the neighbouring islands. (See map on p. 334.)

Coastal stations are being organised for POINT-A-PITRE (Guadeloupe) (see map on p. 295), DJIBOUTI (Somaliland) (see map on p. 273), and CAYENNE (French Guiana) (see map on p. 146).

In the course of erection are high-powered stations at BAMMAKO (on the Niger) (see map on p. 209), at SAIGON (Indo-China) (see above map), and medium-powered stations on the Congo at BANGUI and in the BRAZZAVILLE district (see map on p. 209).

Stations either actually at work or on the point of completion are TIMBUCTOO, AGADES, BILMA (Saharan District) (see map on p. 209), and a set of eight stations on the northern frontiers of Tonkin and Cambodje (MONCAY, LANGSON, CAOBANG, BAOLAC, HAGIANG, LAOKAY, LUANGPRABANG, VIEN-TIANE). (See above map.)

Madagascar is proceeding with the organisation of four stations at TANANARIVE, TULLEAR, AMBOHIBE, and MAINTIRANO. (See map on p. 210.)

The stations at ATAR and CHINGUETTI (Mauritania) (see map on p. 209) have been opened to the public and are in communication with Senegal via Port Etienne and Rufisque.

FRIENDLY ISLANDS

(See Pacific Islands—Tonga Islands.)

GAMBIA

THE Colony of the Gambia was created in 1843, after a long history of trading competition in this locality with the Portuguese and French, dating from the time of Queen Elizabeth. Its separate constitution was inaugurated in 1888. The total area of the various islands and mainland adjacent thereto which go to make up the Colony is estimated at 4,000 square miles. The chief town is Bathurst, situated on the island of St. Mary, at the mouth of the River Gambia, in 13° 24′ North latitude, and the only wireless station in the colony is located there.

ORGANISATION.

Ruled as a Crown Colony, the administration is vested in a Governor assisted by two councils, one executive and one legislative, consisting of nominated and elected members.

A proposal to establish wireless telegraph and telephone stations at Bathurst and MacCarthy Island is under consideration.

There are no *privately owned* wireless stations in the Colony, nor are there any *wireless clubs* or *societies*.

ADMINISTRATION.

The rules governing the working of wireless telegraphy in this Colony were originally instituted under the Ordinance (Maintenance of Control) of 12th February, 1903. This has now been repealed and the ruling Ordinance is that of the 22nd September, 1913, entitled "An Ordinance to provide for the Regulation of Telegraphs." The text will be found below.

A—Ordinance, September 22nd, 1913.
B—Schedule.
C—Rules under 1913 Ordinance.

A I. This Ordinance may be cited as "The Telegraphs Ordinance, 1913."

II. The words "telegraphy" and "telegraph" mean any system used for conveying, transmitting or distributing electricity or any like agent for the purpose of communication from one point to another.

The expression "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

III. The Governor may, whenever he shall deem it expedient to do so, license the establishment of any telegraph station, or the installation or working of any apparatus for wireless telegraphy, in any place in the Colony or Protectorate or on board any British ship registered in the Colony.

IV. (1) No person shall establish any telegraph station, or instal or work any apparatus for wireless telegraphy, in any place in the Colony or Protectorate or on board any British ship registered in the Colony except under, and in accordance with, a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period, as the Governor in Council may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

V. (1) If any person establishes a telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one hundred pounds or to imprisonment with or without hard labour for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for telegraphy installed or worked without a licence; but no proceedings shall be taken against any person under this section except with the sanction of the Legal Adviser to the Governor.

(2) If the Chief Magistrate, the Police Magistrate, or a Justice of the Peace is satisfied by information on oath that there is reasonable ground for believing that a telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the

jurisdiction without a licence in that behalf, he may grant a search warrant to any Police Officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used, or intended to be used, for telegraphy therein.

VI. (1) The Governor in Council may amend, vary or revoke any of the regulations contained in the Schedule to this Ordinance, and may make regulations for all or any of the following matters :—

(i) prescribing the form and manner in which applications for licences under this Ordinance are to be made ;

(ii) prescribing the fees payable on the grant of any licence ;

(iii) prohibiting or regulating the use of telegraphy in such telegraph stations, or of wireless telegraphy on board such ships while in such waters, by such further rules as the Governor-in-Council may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable, if at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over telegraph stations or over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony.

(2) Provided that no regulations made in respect of the provisions in this section contained shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

VII. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

VIII. (1) Every omission or neglect to comply with, and every act done or attempted to be done contrary to the provisions of thi- Ordinance or of any regulation made theres under, or in breach of the conditions and restrictions subject to, or upon, which any licence has been issued shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine not exceeding fifty pounds or to imprisonment with or without hard labour for a term not exceeding six months.

(2) All convictions, forfeitures and fines under this Ordinance or any regulations made thereunder may be had and recovered before a Court of Petty Sessions.

IX. Nothing in this Ordinance contained shall invalidate or impair any agreement now in force entered into between the Governor of this Colony, or the Imperial Government on behalf of the Government of this Colony, and any telegraph company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance and use thereof or to the payment of any subsidy to such company by the Government of this Colony or any other the like matter.

X. Nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

XI. The Telegraphic Establishments (Maintenance of Control) Ordinance 1903 is hereby repealed.

* * *

To this Ordinance is attached a Schedule which runs :—

THE SCHEDULE.

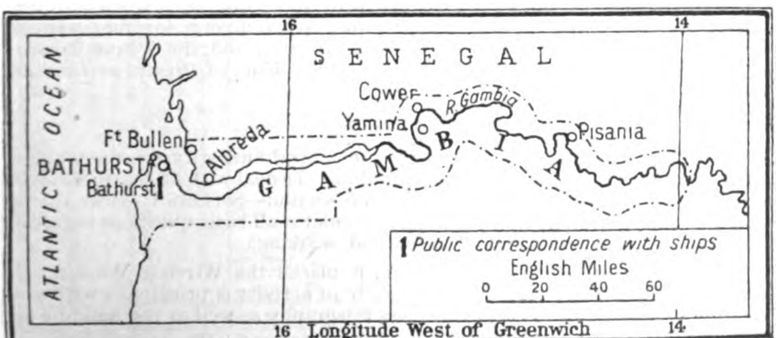
B 1. All apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, or in the Protectorate, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, shall be worked or used whilst such ship is in any of the harbours of the Colony or Protectorate except with the special or general permission of the Governor.

3. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

* * *

It will be noted that under section VI. of this Ordinance the Governor-in-Council has power to make regulations. Of those which His



Excellency has accordingly promulgated under date of the 28th January, 1914, the text runs as follows:—

RULES MADE BY THE GOVERNOR-IN-COUNCIL UNDER SECTION VI. OF THE TELEGRAPHS ORDINANCE, 1913.

C 1. These rules may be cited for all purposes as "The Telegraph Rules, 1914."

2. The expression "the Company" shall mean any company, corporation or person for the time being engaged in the Colony or Protectorate of the Gambia in transmitting or receiving telegrams.

3. If and whenever in the opinion of the Governor an emergency shall have arisen in which it is expedient for the public service that the Government of the Colony and Protectorate of the Gambia shall have control over the transmission of telegrams by the Company, it shall be lawful for the Governor by warrant under his hand to direct and authorise such persons as he may think fit to assume the control of the transmission of telegrams by the Company either wholly or partly and in such manner as he may direct, and such persons may enter upon the Company's premises accordingly or the Governor may direct the Company to submit to him or any person authorised by him all telegrams tendered for transmission or received by the Company or any class or classes of such telegrams, and to stop or delay the transmission of any telegrams or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of telegrams as the Governor may prescribe, and the Company shall obey and conform to all such directions.

Provided always that if default shall be made by the Company in the observance or performance of any provision hereinbefore contained it shall be lawful for the Governor by warrant under his hand to direct and cause so much of the Company's works as are in the Colony or Protectorate of the Gambia or any part of such works to be taken possession of for such services as to the Governor may seem fit, and in that event any person authorised by the Governor may enter upon the offices and works of the Company or any of them and take possession thereof and use the same as aforesaid. Nothing herein contained shall be deemed in any way to prejudice or abridge the power of the Government of the Colony and Pro tectorate of the Gambia to take possession under or by virtue of any agreement for the time being in force.

4. In any such case as aforesaid if the Company show that during the exercise of any of the powers aforesaid their receipts from the telegraphs with respect to which the said powers have been exercised have been less than their receipts from the same source during a corresponding period on the average of the last preceding three years the Government of the Colony and Protectorate of the Gambia shall pay to the Company as compensation for any loss of profit sustained by the Company by reason of the exercise by the Governor of any of the powers hereby reserved such sum as may be settled between the Governor and the Company by agreement or as in case of difference may be determindn by arbitration. Provided always that no such compensation as aforesaid shall be paid if and so far as the powers hereby reserved to the Governor are exercised for the purpose of preventing direct communication with any of His Majesty's enemies, and save with the consent of the Governor no such compensation shall be paid if and so far as the powers aforesaid are exercised for the purposes of preventing indirect or suspected communication with any of His Majesty's enemies or of protecting the interests of His Majesty under the apprehension of impending war.

5. In estimating such compensation as in the preceding section provided the Arbitrator shall take into account all the circumstances of the case, including not only any such loss as aforesaid but also any additional profit accruing to the Company from the emergency which gave rise to the exercise of the powers aforesaid, and as regards the telegraphs with respect to which the said powers have been exercised the receipts of the Company on the average of the last preceding three years during a period corresponding to that of the exercise of the said powers shall be deemed to be the receipts which the Company would have taken during the period of the exercise of the said powers had the powers not been exercised.

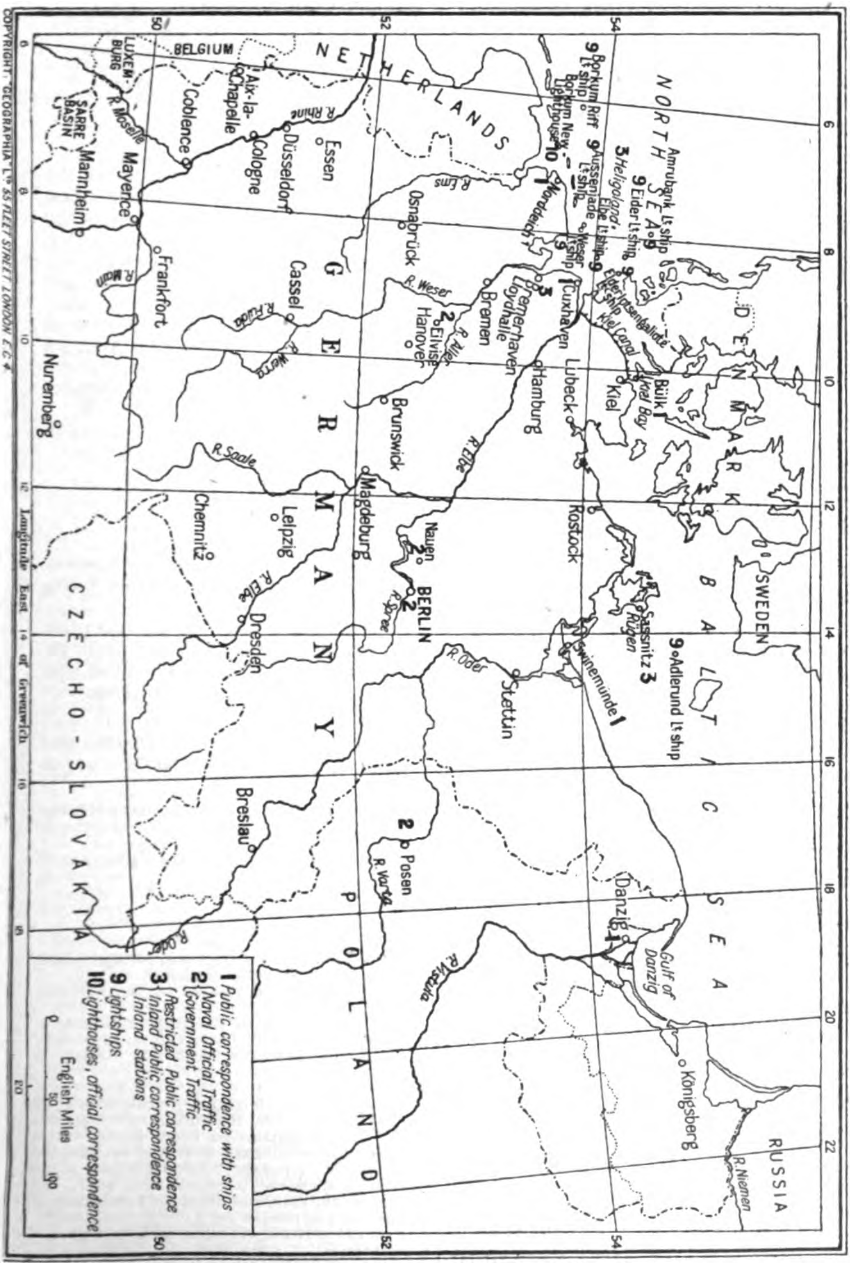
GERMANY

THE German "Empire" dates only from April 16th, 1871, when the Kingdoms of Prussia, Bavaria, Saxony and Wurtemberg, together with six Grand Duchies, five Duchies, seven Principalities, and the "Free Towns" of Lubeck, Bremem, and Hamburg, elected the King of Prussia as *Deutscher Kaiser.*

CONTROL.

The Imperial Ministry of Posts is the central authority for the whole of the wireless system of the German Republic. To deal with all matters having reference to wireless telegraphy, a special section—Section V.—was formed in the Imperial Ministry of Posts, which regulates all basic questions regarding installation, administration of traffic and working.

Under the authority of Section V. is placed the Wireless Working Department (*Funk-Betriebsamt*), whose sphere of activity is principally with work relating to the technical side of wireless telegraphy as well as the building and working of wireless installations.


NORTH SEA
BALTIC SEA
DENMARK
SWEDEN
RUSSIA
NETHERLANDS
BELGIUM
LUXEMBURG
SARRE BASIN
GERMANY
POLAND
CZECHO-SLOVAKIA
Amrubank Lt.ship
9 Eider Lt.ship
3 Heligoland
Elbe Lt.ship
Borkum Riff Lt.ship
Borkum New Lighthouse
Aussenjade Lt.ship
Weser Lt.ship
Norddeich
Cuxhaven
Bremerhaven Lloydhalle
Bremen
Kiel Canal
Kiel
Kiel Bay
Bülk
Lubeck
Hamburg
Rostock
Sassnitz
Rügen
Adlerund Lt.ship
Swinemunde
Stettin
Danzig
Gulf of Danzig
Königsberg
R. Niemen
R. Vistula
R. Warta
Posen
Breslau
R. Oder
BERLIN
Nauen
R. Spree
Dresden
Leipzig
Chemnitz
R. Elbe
Magdeburg
Brunswick
Hanover
Eilvise
R. Aller
R. Weser
Osnabrück
R. Ems
Essen
Düsseldorf
Cologne
Aix-la-Chapelle
Coblence
R. Rhine
R. Moselle
Mayence
Mannheim
Frankfort
R. Main
Cassel
R. Fulda
R. Werra
R. Saale
Nuremberg
Longitude East 14 of Greenwich
1 Public correspondence with ships
2 Naval Official Traffic, Government Traffic
3 Restricted Public correspondence, Inland Public correspondence, Inland stations
9 Lightships
10 Lighthouses, official correspondence
English Miles
COPYRIGHT "GEOGRAPHIA" LTD 55 FLEET STREET LONDON E.C.4

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
M. Giesberts	Minister of Posts	Berlin
Dr. Engineer h.c. Hans Bredow ..	Controller of Wireless Telegraphy ..	Berlin

ORGANISATION.

Wireless telegraphy, after having demonstrated its serviceability as the result of trials, was brought into the service of general public communication as early as the year 1900, by the utilisation of the coast wireless station on the Island of Borkum. Since then the practical use of wireless telegraphy, which has kept pace with technical development, has been advanced to such a degree that on the outbreak of the world war there were in Germany and in countries under German protection 26 coast stations and over 600 ship stations, in addition to numerous testing stations. There further existed the high-power wireless stations of Nauen and Eilvese for traffic with America and with the high-power stations of Kamina (Togoland) and Windhuk (South-West Africa), as well as the wireless stations at Tsingtau, Yap, Nauru, Rabaul and Apia.

As far as is known, the following are the statistics of land stations in Germany at the present time :—

Public service to ships	6
Public restricted service	11
Government traffic only	3

For the completion of the internal German Wireless Telegraph System, wireless installations have been planned for various places, but further particulars regarding these are not yet available.

The private testing stations, installations on aircraft and for the reception of time signals, which may only be installed and worked with the approval of the State, were closed almost without exception at the outbreak of the war. Negotiations are still pending regarding the re-opening of such stations.

ADMINISTRATION.

Regulations have been newly determined concerning the installation and working of wireless telegraph receiving stations, but no particulars are yet to hand.

The present Wireless Laws and Regulations appear in accordance with the following list :—

A—Telegraph Law of the German Empire, April 6th, 1892, and March 7th, 1908.
B—Regulations (Foreign Ships).
C—Conditions of Concession (Ship Stations).

A *Sole Article.*—The Act of April 6th, 1892, relating to telegraphs in the German Empire is modified as follows :—

1. Article 3 is completed by the following paragraph (2) :—

Installations of electric telegraphs for transmission of messages without the aid of metallic wires of junction shall not be established and worked, except with the authorisation of the State.

2. The following provisions are inserted after Article 3 :—

(3*a*) Telegraphic installations which are not exclusively designed for the internal service of a ship cannot be established and worked on German vessels unless authorised by the State.

(3*b*) The Imperial Chancellor shall decree the regulations concerning the working of telegraph stations on board foreign vessels in German territorial waters.

3. Article 7 is completed by the following paragraph (2) :—

The provision of Paragraph 1, Phrase 1, does not apply till July 1st, 1913, to installations of the nature defined in Article 3, Paragraph 2.

B The following regulations are decreed for the working of telegraphic installations on board foreign ships in German territorial waters, and are founded on Article 3 (*c*) of the "Telegraph Law of the German Empire," of April 6th, 1892, and March 7th, 1908, and under the reservation of Article 15 of this law :—

1. Ships of war are authorised, in a general manner—

(*a*) To exchange messages, signals, by

means of optic and acoustic signals, submarine acoustic signalling excepted.

(*b*) To use wireless telegraphy, on condition that they do not disturb the radiotelegraphic service of the public coast stations, or the service of the coast or ship stations of the Imperial Navy.

In exchanging messages with German or foreign radiotelegraphic stations, foreign vessels must conform to the regulations of the "Decree for the Regulation of the Radiotelegraphic Service" and to the Decrees which may ultimately be promulgated.

2. Foreign vessels other than ships of war are authorised—till otherwise decreed—

(*a*) To exchange messages by means of optic and acoustic signals, submarine acoustic signalling excepted, and under the reservation that within the illumination zone of the navigable waters of the German coasts and islands the lights of the signal projectors or lanterns must not exceed that prescribed for fixed lights.

(*b*) To use wireless telegraphy in conformity with the provisions of the "Decree Regulating the Radiotelegraphic Service" and the decrees which may ultimately be promulgated; nevertheless, in the ports, roadsteads, and estuaries, and in the navigable waterways of the interior, wireless telegraphy can only be used on an authorisation being granted in writing by the Ministry of Posts and Telegraphs of the German Empire.

3. In the public interest the Articles 1 and 2 may be temporarily restricted or suspended.

4. Whosoever works telegraphic installations in a way not authorised by the preceding provisions is liable to fines determined in Article 9 of the "Law of Telegraphs," and in virtue of Article 40 of the Penal Code of the German Empire all the apparatus designed for the transmission of wireless messages can be confiscated. Moreover, installations which have been worked without a licence can be, in conformity with Article 11 of the "Telegraph Law," removed or rendered unserviceable.

C The following are some of the principal conditions on which the concession for the installation and working of a radiotelegraph station on board ship is granted :—

1. The concession for the installation and working of the ship station may be withdrawn at any time.

2. The station must fulfil the following requirements :—

(*a*) The construction of the station must be in accordance with modern developments of science and technology.

(*b*) The ship station must be equipped in such a way as to be able to use the two wavelengths of 600 and 300 metres.

(*c*) The waves must be as pure and little damped as possible. The use of sending arrangements with which the production of the emitted waves takes place by direct sparking discharges of the antenna is not permitted, except in cases of distress. However, it may be allowed for certain special stations—*e.g.*, for such on small ships—the primary energy of which does not exceed 50 watts.

(*d*) The power transmitted by the radiotelegraphic apparatus, measured at the terminals of the generator, must not under normal conditions exceed one kilowatt.

(*e*) With the reservation of the special provisions concerning the application of the 1,800 m. wave, a power of more than one kilowatt may be used if the ship must maintain communication over a distance exceeding 200 nautical miles from the nearest coast station, or if, in consequence of exceptional circumstances, communication cannot be maintained except by means of an increase of power.

(*f*) The apparatus must be suitable for transmitting and receiving at a speed of at least 20 words per minute, five letters being counted as one word. Installations working with more than 50 watts must be equipped so as to be able to cover several distances within the normal range of transmission, the shortest of which shall be about 15 nautical miles.

(*g*) The receiving apparatus must be capable of reception up to 600 miles with the greatest possible protection against disturbances.

3. Ships belonging to the first two categories stated under Article 8, in addition to the ordinary apparatus, must be equipped with emergency gear having an independent source of power and capable of working for at least six hours, with a minimum range of 80 nautical miles in the case of ships in the first category, and of 50 nautical miles of those of the second category. The emergency gear is not necessary in the case of ships whose ordinary plant fulfils the conditions for emergency sets.

The emergency gear, as well as the ship stations themselves, must be placed as high as possible above the deck—viz., according to the structure of the ship and the available space, either equal to the height of the bridge or of the large boat deck, so that in case of accident they shall be able to remain longest above the water. When using batteries for the emergency plants accumulators may be arranged in the station room itself, whilst acid accumulators, on account of the vapours which they develop, must be placed outside the station room, but in its immediate vicinity and so that they are protected against outside influences.

4. The contractor must submit to the Imperial Telegraph Administration a description of the ship station, together with a plan of the circuits. Subsequent alterations of the technical equipment affecting transmission or reception must not be made without the consent of the Imperial Telegraph Administration.

5. In order to examine the prescribed arrangement of the ship's station, and the carrying out of the service, the officers of the Imperial Telegraph Administration are permitted at any time to enter the rooms where the apparatus is installed, and to inspect the working equipments.

6. The radiotelegraph service on the ship must be operated only by German subjects.

7. The service of the ship station must be carried out by an operator holding a certificate issued by the Imperial Telegraph Administration, or in an emergency, and for one journey only, by another Government which is a party to the International Radiotelegraphic Convention.

There are two classes of certificates.

The first-class certificate for the capability of the operator, with regard to :—

(*a*) The adjustment of the apparatus and knowledge of the methods of working.

(*b*) Transmitting of telegrams and receiving by sound at a speed of at least 20 words per minute.

(*c*) Knowledge of the regulations applying to the exchange of radiotelegraphic communication.

The second-class certificate may be issued to an operator who attains in transmitting and receiving a speed of 12 to 19 words per minute, but who fulfils the other conditions mentioned above. Operators holding a second-class certificate may be admitted :—

(*a*) On ships which use radiotelegraphy for their own service only and for the exchange of messages of the crew, in particular on fishing vessels.

(*b*) On all ships as junior operators, provided that such ships have on board at least one operator holding the first-class certificate. Nevertheless on ships placed in the first category mentioned in Article 8 the service must be carried on by at least two operators holding the first-class certificate.

Transmission may be made only by an operator holding either the first or second-class certificate, except in cases of emergency.

8. Ship stations are placed in three categories :

(1) Stations always open.

(2) Stations having limited working hours.

(3) Stations having no fixed working hours.

During navigation the following must remain permanently on watch :—

(1) The stations of the first category.

(2) Those of the second category during the hours that they are open for service ; out of these hours these stations must remain on the watch for the first ten minutes of each hour.

The stations of the third category are not bound to perform any regular "listening" service.

9. The ship station operator is under the supreme authority of the captain or of the captain's representative, who, in his capacity as superintendent of the ship station, is entitled to note the contents of all telegrams provided he has been placed by the Imperial Telegraph Administration, or, in the case of ships that are permanently abroad, by a German Consulate (General or Vice-consulate), under the obligation of preserving the secrecy of correspondence.

10. The certificate may be withdrawn if, in case of any offences against the "Regulations for the Radiotelegraph Service," the operator has been found guilty after an inquiry.

11. If it is shown that the offence is due to the condition of the apparatus or to instructions given to the operator, the same procedure will be followed in respect of the licence issued to the ship.

12. The certificate may also be withdrawn if it is stated by an officer of the Imperial Telegraph Administration that the operator is no more in possession of the prescribed knowledge and skill. In the latter case a certificate will be granted to the operator after he has successfully passed a further examination.

13. Every change in the staff of the ship station must be reported immediately to the local post office of the home port.

14. The ship station is bound to interchange radiotelegrams with every coast station and with every other ship station, without regard to the particular system of radiotelegraphy employed.

15. The Radiotelegraph Service is regulated in accordance with the rules in the "Instructions for the Radiotelegraph Service." In addition, special instructions which may be issued by the Imperial Telegraph Administration must be observed also.

. . . . .

22. The ship station must be in possession of the certificate from the Imperial Telegraph Administration, stating that the installation and the working of the station have been licensed by the authority named and the category in which the station is placed. This certificate must be kept in the station and presented upon the request of the authorities of the countries at the ports at which the ship calls.

GIBRALTAR

(See map on p. 384.)

(Lat. 36° 6′ 23 N. ; Long. 5° 20′ 55 W.)

PERHAPS nowhere in the world has more romance been crowded into a tiny piece of territory than is the case with the rocky promontory, 2½ miles long by ¾ mile broad, which we know as Gibraltar. Its name (*Gebel-Tarik*, the Rock of Tarik, a famous Mohammedan Conqueror) is simply crystallised history. British since 1713, its famous 3½ years siege ended in 1783.

CONTROL.

In this essentially naval and military station, the Commander-in-Chief acts as Governor, exercising autocratically both administrative and legislative functions.

ORGANISATION.

There are no commercial wireless telegraph stations in Gibraltar, and the right to use wireless telegraphy is reserved to the Government. Private wireless of any description, whether amateur, commercial, or experimental, is strictly forbidden ; not only the control, but the possession and working of radiotelegraphy, being exclusively vested in military or naval hands. At the present time there are three stations in existence, one for public service to ships and two used for Government traffic only.

ADMINISTRATION.

The Ordinance to prohibit the importation, keeping, use or establishment of any apparatus or installation for transmission of messages by wireless telegraphy by unauthorised persons in Gibraltar came into force on October 20th, 1903. This Ordinance has been amended by the Wireless Telegraph Apparatus Amendment Ordinance, 1909 (February 3rd), and in the text below the amending words are shown in brackets :—

We print below the ruling Ordinances and regulations :—

A—Wireless Telegraph Apparatus Ordinance, 1903.

B—Wireless Telegraph Apparatus Further Amendment Ordinance, 1909.

C—Rules as to use on Merchant Ships.

A 1. This Ordinance may be cited as "The Wireless Telegraph Apparatus Ordinance, Gibraltar, 1903."

2. No person shall import, keep, use or establish in Gibraltar [*or on board any British ship registered in Gibraltar*] any apparatus or installation for the receipt or transmission of messages by wireless telegraphy without the licence in writing of the Governor, and under such terms and conditions as may be prescribed in such licence, which licence the Governor may in his discretion at any time cancel and revoke.

3. It shall be lawful for the Governor by order in writing to authorise the Chief of Police or any other person named by him in such order to enter at any time by day or night and by force, if necessary, any premises or place [*or any ship*] in Gibraltar, and to search for any such apparatus or installation as described in this Ordinance, and to seize and remove the same to be dealt with in such manner as the Governor may direct.

4. Any person offending against this Ordinance, or resisting or in any way interfering with any person charged with the execution of an order issued by the Governor under the preceding section, may be arrested without warrant and shall be liable on conviction by a Court of Summary Jurisdiction to a penalty not exceeding £50, or to imprisonment with or without hard labour for any term not exceeding three months.

5. All penalties under this Ordinance shall be recoverable summarily in manner directed by "The Justices Ordinance, Gibraltar, 1890."

B The "Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909" (April 30th), contains the following clause :—

2. A person shall not work any apparatus for wireless telegraphy installed on merchant ships, whether British or foreign, while in Gibraltar otherwise than in accordance with rules made in that behalf by the Governor, and the Governor may, by any such rules, impose penalties recoverable summarily for the breach of any such rules, not exceeding £10 for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ships. All such rules shall be published in the Official Gazette and after such publication shall have the same force and effect as if enacted in this Ordinance.

C The following rules as to the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in Gibraltar, were made on May 3rd, 1909, under "The Wireless Telegraph Apparatus Further Amendment Ordinance, Gibraltar, 1909" :—

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of Gibraltar shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in Gibraltar or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of Gibraltar, except with the special or general permission in writing of the Governor.

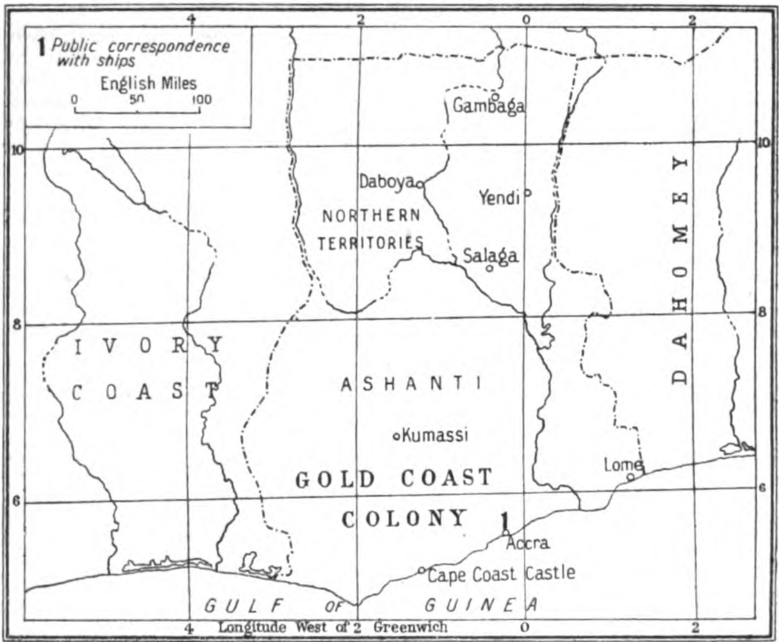
3. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy the use of wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These rules shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. Any person offending against any of these rules shall be liable to a penalty not exceeding ten pounds for each offence recoverable summarily under "The Justices Ordinance, Gibraltar, 1890," and any apparatus for wireless telegraphy installed or worked on such ship may be forfeited to His Majesty.

GOLD COAST COLONY

THE Gold Coast Colony comprises the coast of the Gulf of Guinea from about longitude 3° 7′ W. to 1° 14′ E. of Greenwich ; with a protectorate extending inland to an average distance of 440 miles or to the 11° of N. latitude. It is bounded on the west and north by the French colonies of the



Ivory Coast and French Sudan, and on the east by the ex-German colony of Togoland. The natives are almost all Pagans, but Mohammedanism and Christianity are steadily gaining ground. English merchants started trading at Kormantyne on this coast in 1618, and Chartered Companies subsequently took up the task of organising British trade. Their settlements were in 1821 transferred to the Crown, and a separate establishment under the title of Gold Coast Colony was created in 1874. The seat of Government is at Accra, and the administration is conducted by a Governor, aided by a nominated executive Council and by a legislative Council of six official and four unofficial members.

CONTROL.

OFFICIALS ADMINISTERING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. S. B. Gosling	Postmaster-General	Accra
Major J. F. O'Shaughnessy	Engineer-in-Chief of Posts and Telegraphs Dept.	Do.
Mr. L. C. C. Miles	Operator	Do.
Mr. P. McC. Connolly	Do.	Do.

ORGANISATION.

Radiotelegraphy was introduced in 1912, and in 1913 the Accra station was completed.

There are no privately owned experimental or amateur stations ; neither are there any wireless clubs or societies. In fact, no licences have been issued to any classes of individual or corporations, radiotelegraphy in this Colony being still in its infancy.

ADMINISTRATION.

The first Act to regulate radiotelegraphy in this colony was " The Wireless Telegraphy Ordinance, 1903." This was followed by " The Wireless Tele-

graphy (Amendment) Ordinance, 1913" (see the WIRELESS YEAR-BOOK for 1915). These Ordinances, however, were both of them repealed by "The Wireless Telegraphy Ordinance No. 15 of 1913," which is the extant Government Ordinance as at present administered, and the text thereof will be found below.

Annexed to this Ordinance are regulations applying to Merchant Ships, whereof the text appears below. In 1917 the Government promulgated Rules for the Regulation of Wireless Telegraphy within its territorial waters. These rules also figure in the following pages :—

The Laws and Regulations here printed are :—

A—Wireless Telegraphy Ordinance No. 15 of 1913 (dated October 4th, 1913).
B—Regulations (Merchant Ships).
C—Rule No. 17 of 1917.

A An Ordinance (No. 15) to provide for the regulation of Wireless Telegraphy, 4th October, 1913.

Be it enacted by the Governor of the Gold Coast Colony, with the advice and consent of the Legislative Council thereof, as follows :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraphy without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or install or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions, and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or Foreign, while that ship is in the Colonial waters otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the Colonial waters shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate or District Commissioner is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any Commissioner or Assistant Commissioner of Police or any person appointed in that behalf by the Commissioner of Police and named in the warrant, and a warrant so granted shall authorise the Commissioner or Assistant Commissioner of Police or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before a District Commissioner's Court on the complaint of a Commissioner or Assistant Commissioner of Police or of any person thereto authorised by the Commissioner of Police in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraphy Ordinance, 1903, and The Wireless Telegraphy (Amendment) Ordinance, 1913, are hereby repealed.

REGULATIONS.

B (i) All apparatus for wireless telegraphy on board a merchant ship in the Colonial waters shall be worked in such a way as not to interfere with—

(*a*) Naval Signalling, or

(*b*) The working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the Colonial waters and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(ii) In these regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His

Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

(iii) No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour, port or bay of the Colony except with the special or general permission of the Governor.

(iv) For the purpose of any proceedings under these regulations the master or person being, or appearing to be, in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(v) Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being, or appearing to be, in command or charge of the ship.

(vi) These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

RULE No. 17 OF 1917.

C

Under and by virtue of section 8 of the Defence of the Colony Ordinance, 1914, I, Sir Hugh Charles Clifford, Knight Commander of the Most Distinguished Order of Saint Michael and Saint George, Governor and Commander-in-Chief of the Gold Coast Colony, with the advice of the Executive Council of the said Colony, do hereby make the following rules which I, with the advice aforesaid, consider necessary for the public safety and the Defence of the Colony.

1. The radiotelegraph stations on board ships (other than His Majesty's ships of war) shall not be worked, except for the reception of messages whilst such ships are within any harbour, port or within any roadstead within the Colonial waters of the Colony.

2. For the proper enforcement of the last preceding rule.

(*a*) The master of every ship of British or Allied register whilst in any such harbour, port or roadstead shall cause the sending and transmitting portion of the radio apparatus on such ship to be disconnected and to be kept disconnected from the dynamo, accumulators, or other source of electrical power available, so that radio messages cannot be sent from the ship.

(*b*) If an officer appointed in writing by the Postmaster-General to examine the wireless apparatus on any ship shall so order, the master of such ship within such harbour, port or roadstead shall cause all portions of the radio apparatus on such ship to be disconnected or sealed in such manner as such officer shall order, and shall cause the same to be kept so disconnected or sealed while such ship is within such harbour, port or roadstead.

(*c*) The master of a ship of neutral register shall immediately on arrival in any such harbour, port or roadstead cause the aerial wires to be taken down completely and disconnected from the radiotelegraph apparatus on such ship and shall cause such wires to remain so down and disconnected while such ship is in such harbour, port or roadstead, and shall cause the operating room to be sealed and kept sealed and such other steps to be taken as any officer appointed by the Postmaster-General for the purpose may order.

Made at a meeting of the Executive Council held at Government House, Accra, this 1st day of September, 1917.

(Signed) HUGH CLIFFORD,
Governor.

GREAT BRITAIN

THE more correct title for the heart of the British Empire is that of the "United Kingdom," for just as we are a mixture of races, so are we also a mixture of nationalities. Wales was linked with England in the thirteenth century under Edward I., and in the Tudors has contributed a line of kings to the British throne. The Scotch joined hands with the English under James VI. of Scotland and First of England, the Stuart Dynasty originating in the Northern Kingdom. Ireland remained a separate entity until the Act of Union, which came into force on January 1st, 1801.

The total area of the British Isles is reckoned at 121,377 square miles, whilst in 1914 the population numbered 46,500,000. In the same year there were 23,701 miles of railway and 2,886,025 miles of telegraphic and telephonic wires (exclusive of wireless aerials).

Our own country is proud to share with Italy in the production of Senatore Marconi. If his father was Italian, his mother was Irish; and if Italy was the place of his birth, England has been the chief scene of his labours. The first British patent for Wireless Telegraphy was No. 12,039, lodged by the Italian inventor in 1896. Ever since that date the United Kingdom has been in the forefront of wireless activities, and British radiotelegraphy is continually expanding in all directions.

CONTROL.

The Postmaster-General is responsible for the administration of wireless telegraphy in Great Britain and Ireland.


1 Public correspondence with ships
2 Naval Official Traffic
Government Traffic
4 Direction Finding Service
11 Private stations
12 Under construction
13 Aviation stations only
English Miles
0
50
ATLANTIC OCEAN
Shetland Islands
2 Lerwick
Orkney Islands
Duncansby Hd
Wick
Butt of Lewis
Flannan Is
Hebrides or Western Isles
The Minch
Little Minch
NORTH SEA
Cromarty 2
Moray Firth
Kinnaird Hd
Inverness
Peterhead 4
Lochboisdale
Caledonian Canal
Aberdeen 2
Stonehaven 2
SCOTLAND
Tobermory 2
Dundee
Firth of Lorne
Inchkeith 2
Firth of Forth
Greenock
GLASGOW
Renfrew
12,13
Clyde
Rosyth 2
EDINBURGH
Berwick 4
Holy I.
R Tweed
Firth of Clyde
North Channel
IRELAND
Portpatrick 2
Newcastle
Cullercoats 1
Tynemouth 2
Sunderland
Carlisle
Solway Firth
R Tees
Stockton 2
Middlesbrough
2 Scarborough
I of Man
Barrow
ENGLAND
Heysham Harbour 11
Flamborough 4
York
Bradford
Leeds
Hull
IRISH SEA
Blackburn
Halifax
Bolton
R Humber
Amlwch 4
Liverpool
Manchester
12,13 Didsbury
Longitude West of Greenwich

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Rt. Hon. A. H. Illingworth, P.C., M.P.	Postmaster-General	General Post Office, London, E.C.
Sir George Evelyn P. Murray, K.C.B.	Secretary to Post Office ..	Ditto.
F. J. Brown, M.A., B.Sc. ..	Assistant Secretary to Post Office	Ditto.
J. I. De Wardt, O.B.E. ..	Principal Clerk..	Ditto.
F. W. Phillips	First-Class Clerk	Ditto.

Department of the Inspector of Wireless Telegraphy.

Official.	*Title.*	*Address.*
Comdr. F. G. Loring, R.N., M.I.E.E.	Inspector of Wireless Telegraphy	General Post Office, London, E.C.
Lt.-Col. C. G. C. Crawley, R.M.A., M.I.E.E.	Deputy Inspector of Wireless Telegraphy	Ditto.
F. Addey, B.Sc. Lond., A.M.I.E.E. O. F. Brown, M.A., B.Sc. Oxon. and Lond.	Assistant Inspectors of Wireless Telegraphy	Ditto.

ORGANISATION.

Early in 1914 a Bill was presented to the House of Commons by the President of the Board of Trade to amend the laws relating to merchant shipping so as to give effect to the International Convention for the Safety of Life at Sea, signed at London on January 20th, 1914. Under the title "Merchant Shipping (Convention) Act, 1914," this Bill was passed in August 1914, and was due to come into force on July 1st, 1915, but has not yet been put into operation. Part III. of the Act refers to wireless telegraphy and is printed below.

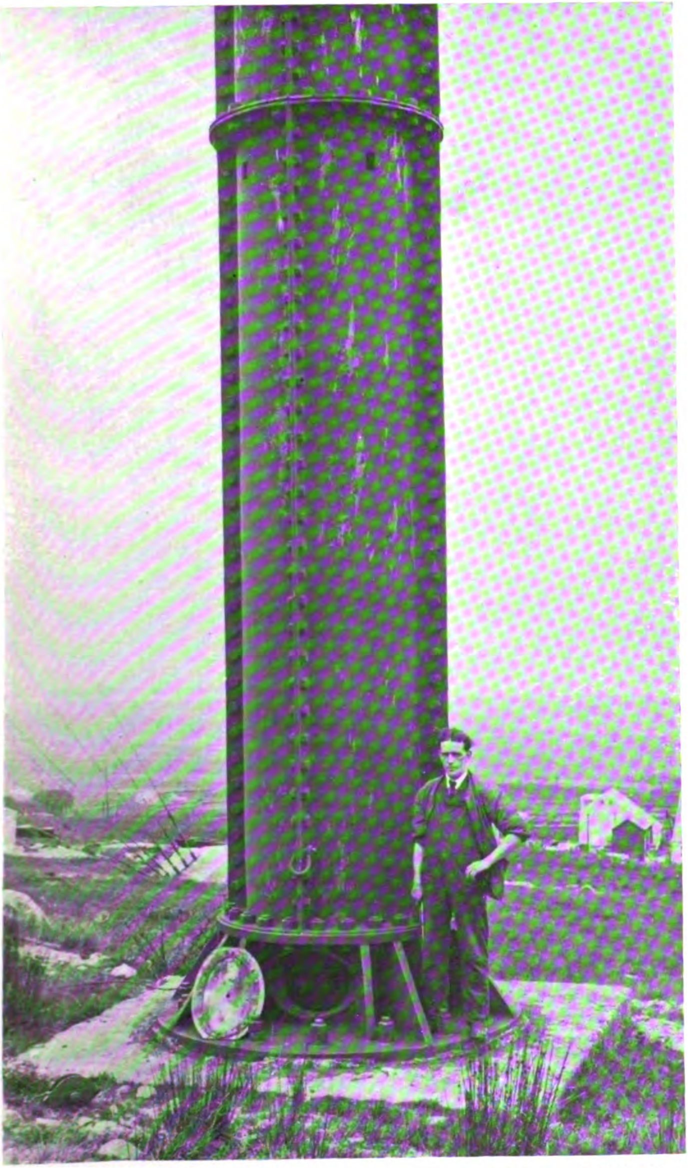
At the outbreak of war all wireless stations in the British Empire were brought under the control of the Government, and in the following pages we have included an extract from the Defence of the Realm (Consolidation) Regulations, 1914, which relates to the prohibition of the possession of wireless telegraphic apparatus, unless with the official permission of the Postmaster-General.

The Defence of the Realm Act received amendments from time to time, applying now to one section, now to another. Regulation 37B, which is devoted to Wireless Telegraphy and was made in July, 1916, provided for the obligatory installation of wireless on every vessel of 3,000 tons or over registered at a British port. This was amended in October, 1917, to cover British vessels of 1,600 tons and over.

A new Act—the Merchant Shipping (Wireless Telegraphy) Act, 1919—will come into operation as soon as the detailed rules provided for in the Act have been made. We print the Act herewith, but the rules are not yet sufficiently settled for us to incorporate them here. When this Act comes into operation Regulation 37B of the Defence of the Realm Act will be cancelled. These changes will also entail a modification of the form of Ship Licence.

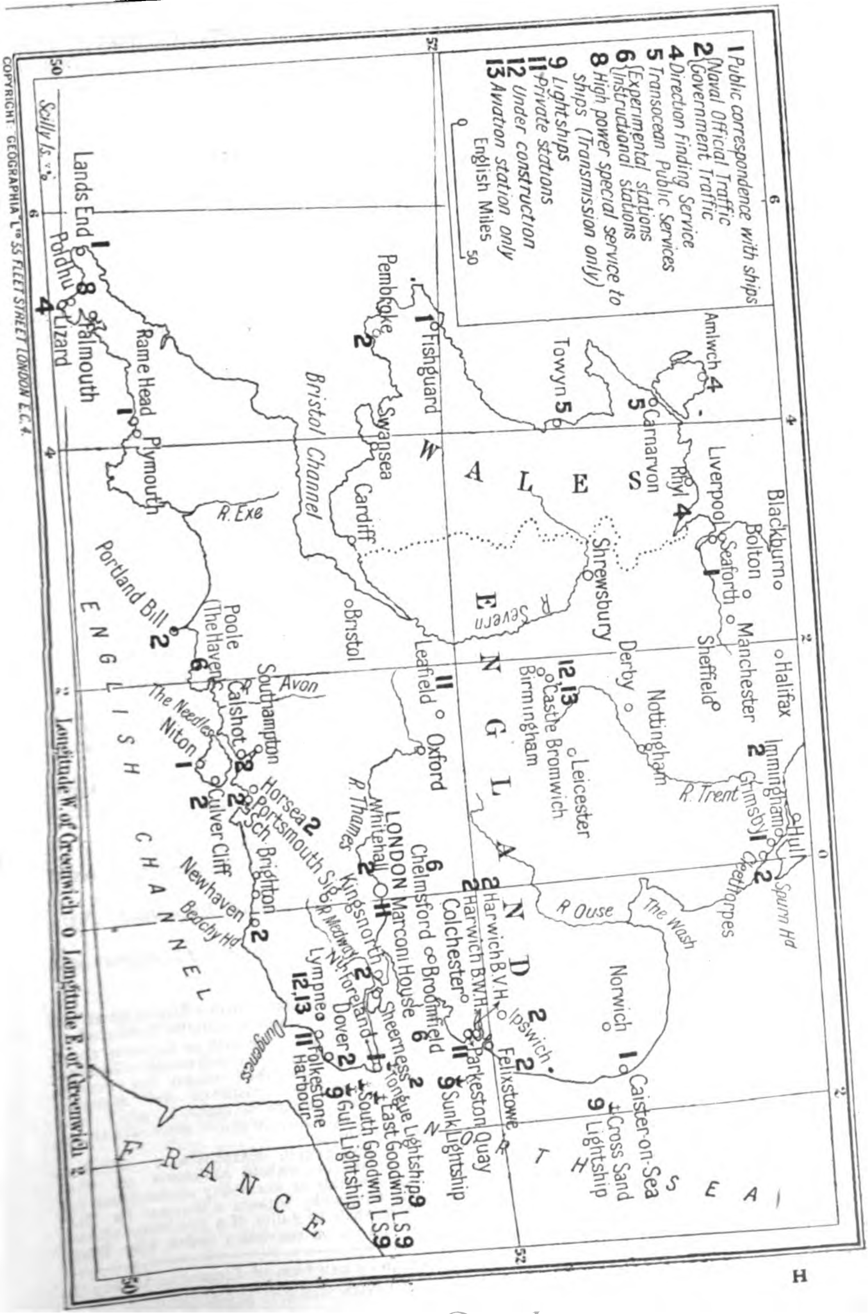
Regarding experimental and private business stations a new Wireless Telegraphy Bill is to be introduced into Parliament and when this has been passed the various forms of experimental and private business licence will be revised. In the meantime the General Post Office is issuing temporary permits for (*a*) transmitting and receiving, and (*b*) receiving only, on the conditions stated below.

The partial removal of restrictions on Amateur working which has already taken place was immediately productive of a keen stimulus to Amateurism. The Wireless Society of London and kindred associations



BASE OF A 400 FT. STEEL MAST, CARNARVON WIRELESS STATION.

[To face page 224


1 Public correspondence with ships
2 Naval Official Traffic
Government Traffic
4 Direction Finding Service
5 Transocean Public Services
6 Experimental stations
Instructional stations
8 High power special service to ships (Transmission only)
9 Lightships
11 Private stations
12 Under construction
13 Aviation station only
English Miles
W A L E S
E N G L A N D
Bristol Channel
E N G L I S H C H A N N E L
N O R T H S E A
F R A N C E
Lands End
Poldhu
Lizard
Falmouth
Rame Head
Plymouth
Portland Bill
Poole (The Haven)
The Needles
Niton
Culver Cliff
Calshot
Southampton
Horsea
Portsmouth
Brighton
Newhaven
Beachy Hd
Pembroke
Fishguard
Swansea
Cardiff
Bristol
Towyn
Carnarvon
Amlwch
Rhyl
Liverpool
Seaforth
Blackburn
Bolton
Manchester
Halifax
Sheffield
Shrewsbury
Derby
Nottingham
Birmingham
Castle Bromwich
Leicester
Leafield
Oxford
LONDON
Whitehall
Marconi House
Chelmsford
Broomfield
Colchester
Harwich
Ipswich
Felixstowe
Parkeston Quay
Kingsnorth
Sheerness
N. Foreland
Dover
Folkestone Harbour
Lympne
Dungeness
Norwich
Caister-on-Sea
Cross Sand Lightship
Sunk Lightship
Tongue Lightship
East Goodwin L.S.
South Goodwin L.S.
Gull Lightship
Immingham
Grimsby
Hull
Cleethorpes
Spurn Hd
The Wash
R. Exe
R. Severn
R. Avon
R. Thames
R. Trent
R. Ouse
R. Medway
Scilly Is.
Longitude W. of Greenwich 0 Longitude E. of Greenwich
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H

have resumed activities with more than pre-war ardour, and fresh societies are springing up in various parts of the country. (*For lists of Amateur Societies, see special section of Year-Book.*)

According to the latest statistics (January, 1920), the following (excluding Amateur) stations are in operation :—

Public service to ships	16
Government traffic only	32
Direction-finding service	9
Lightships	6
Trans-ocean service	3
Private stations	10
Experimental stations	3

Under the Air Navigation Regulations, 1919, extracts of which we print below, it is unlawful to establish or work any wireless telegraph apparatus in any British Aircraft, except under and in accordance with a licence granted by the Postmaster-General, containing such conditions as may be approved by the Secretary of State for Air. A form of licence for the wireless installation on aircraft is in draft but, certain details having still to be settled, we are not yet able to reproduce the text. The Syllabus of examination for certificate to act as wireless operator in aircraft is likewise not yet definitely settled.

ADMINISTRATION.

The following is the list of items to be found below :—

A—Wireless Telegraphy Act, 1904.
B—Order in Council, February 29th, 1908.
C—Wireless Telegraphy (Foreign Ships) Regulations, 1908.
D—Ship Stations Licence.
E—Private Business Licence.*
F—Board of Trade Notice (Signalling Practice).
G—Merchant Shipping (Convention) Act, 1914. (Part III.)
H—Defence of the Realm Regulations, 1914.
I—Proclamation extracted from *London Gazette*, July 28th, 1916.
J—Amendment to Defence of Realm Act, dated October 23rd, 1917.
K—Extracts from *London Gazette*, April 29th, 1919.
L—Circular to Owners and Masters of British Merchant Ships. (Part II.) Relaxation of Restrictions on use of Wireless Telegraphy, dated 22nd November, 1919.
M—Merchant Shipping (Wireless Telegraphy) Act, 1919.
N—Postmaster-General's authority for the use of Transmitting and Receiving Apparatus for Amateurs.
O—Postmaster-General's authority for the use of Receiving Apparatus only for Amateurs.
P—Extract from Convention relating to International Air Navigation 1919.

WIRELESS TELEGRAPHY ACT, 1904.

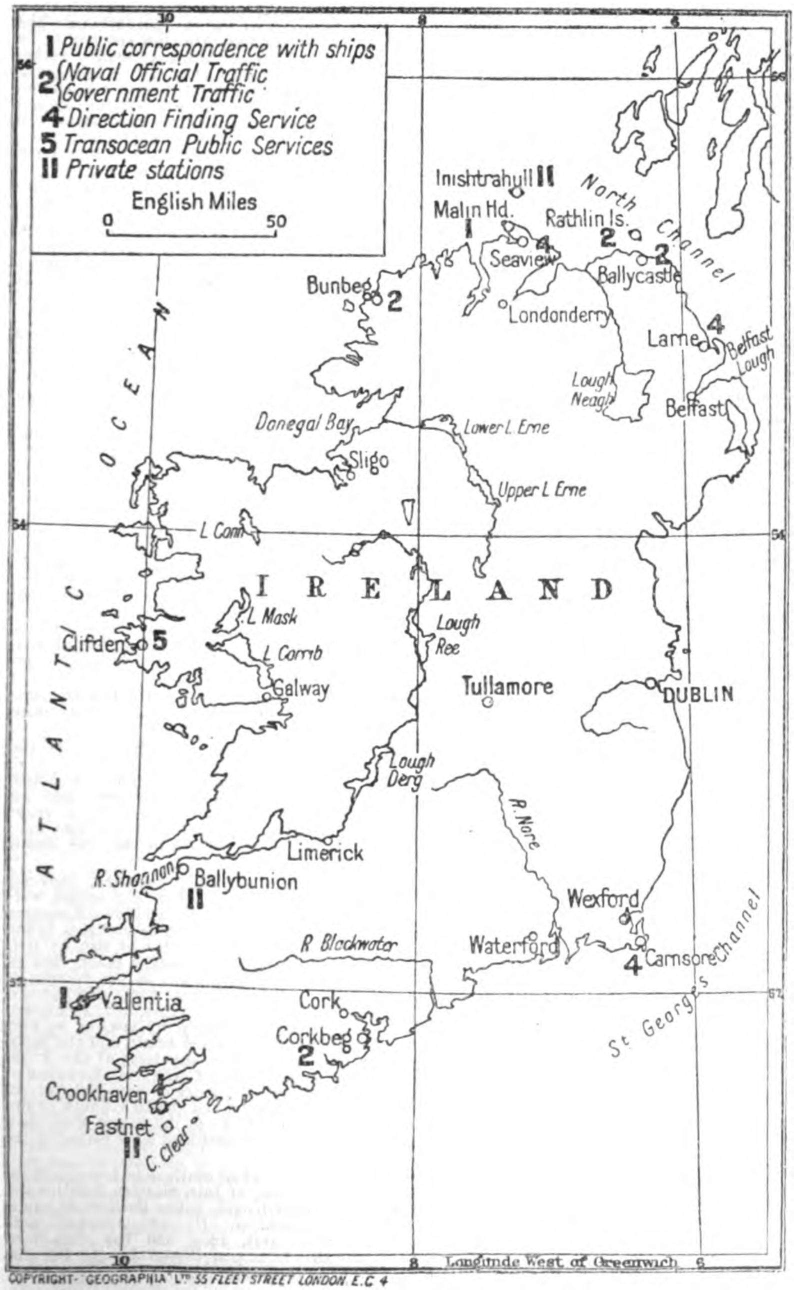
A Following the termination of the meeting of the delegates at the International Conference in Berlin in 1903, the British Government drafted a Wireless Telegraph Act to define the official position of the Postal and Telegraph Department in the United Kingdom in regard to the new development. The Act received Royal assent on August 15th, 1904, and the text is as follows :

1. (1) A person shall not establish any wireless telegraph station, or instal or work any apparatus for wireless telegraphy, in any place or on board any British ship except under and in accordance with a licence granted in that behalf by the Postmaster-General.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms, conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places, or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable, on conviction under the Sum-

* The terms of this Licence are no longer operative, and a new form of Licence is likely to be issued shortly.


1 Public correspondence with ships
2 {Naval Official Traffic / Government Traffic
4 Direction Finding Service
5 Transocean Public Services
II Private stations
English Miles
0 50
ATLANTIC OCEAN
North Channel
Inishtrahull II
Malin Hd.
Rathlin Is.
Seaview
Ballycastle
Bunbeg
Londonderry
Larne
Belfast Lough
Lough Neagh
Belfast
Donegal Bay
Lower L. Erne
Sligo
Upper L. Erne
L. Conn
IRELAND
L. Mask
L. Corrib
Lough Ree
Clifden
Galway
Tullamore
DUBLIN
Lough Derg
R. Nore
Limerick
R. Shannon
Ballybunion
Wexford
R. Blackwater
Waterford
Carnsore
Valentia
Cork
Corkbeg
St George's Channel
Crookhaven
Fastnet
C. Clear
Longitude West of Greenwich
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mary Jurisdiction Acts, to a penalty not exceeding ten pounds, and on conviction on indictment to a fine not exceeding one hundred pounds, or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade.

(4) If a justice of the peace is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within his jurisdiction without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, the Admiralty, the Army Council, or the Board of Trade, and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) Sections 684, 685, and 686, of the Merchant Shipping Act, 1894 (which relate to the jurisdiction of courts and justices), and section 693 of the same Act (which relates to distress for sums ordered to be paid by masters and owners of ships), shall apply to the jurisdiction of courts and justices in respect of ships, and to distress under this Act.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and, with the consent of the Treasury, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in the Telegraph Acts 1863 to 1904, without the aid of any wire connecting the points from and at which the messages or other communications are sent and received; Provided that nothing in this act shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

2. (1) Where the applicant for a licence proves to the satisfaction of the Postmaster-General that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted, subject to such special terms, conditions, and restrictions as the Postmaster-General may think proper, but shall not be subject to any rent or royalty.

(2) Where an applicant for a licence satisfies the Postmaster-General that a wireless telegraph station is to be used solely for the transmission of telegrams which are within the first or second exception from the exclusive privilege of transmitting telegrams conferred upon the Postmaster-General by the Telegraph Act, 1869, a licence for that purpose, if granted, shall not be subject to any rent or royalty.

(3) It shall be lawful for the Postmaster-General, due regard being had to the maintenance and exercise of effective control over wireless telegraphy, to grant special licences at reduced terms for the establishment and working of wireless telegraph stations to be used exclusively for the transmission within the United Kingdom of news to public registered newspapers. A schedule of all reduced rents or royalties imposed by any special licences shall be laid before both Houses of Parliament within fourteen days of the commencement of the session next succeeding the grant of any such licences.

3. (1) This Act may be cited as the Wireless Telegraph Act, 1904, and may be cited with the Telegraph Acts, 1863 to 1904.

(2) This Act shall extend to the whole of the British Islands and to all British ships in the territorial waters abutting on the coast of the British Islands, and the Royal Courts of the Channel Islands shall register this Act accordingly.

(3) His Majesty in Council may order that this Act shall, subject to any conditions, exceptions, and qualifications contained in the order, apply during the continuance of the order to British ships whilst on the high seas.

(4) A person shall not work any apparatus for wireless telegraphy installed on a foreign ship whilst that ship is in territorial waters otherwise than in accordance with regulations made in that behalf by the Postmaster-General, and the Postmaster-General may, by any such regulations, impose penalties recoverable summarily for the breach of any such regulations not exceeding ten pounds for each offence and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship. Save as aforesaid, nothing in this Act shall apply to the working of apparatus for wireless telegraphy installed on any foreign ship.

4. In the application of this Act to Scotland the expression "Misdemeanour" means crime and offence.

5 In the application of this Act to the Channel Islands and the Isle of Man:—

(1) The Lieutenant-Governor of the Island of Jersey or the Island of Guernsey, and the Governor, Lieutenant-Governor, or Deputy-Governor of the Isle of Man, as the case may require, shall be substituted for the Board of Trade.

(2) Offences may be prosecuted, fines recovered proceedings taken, and search warrants issued in such courts and in such manner as may for the time being be provided in the Channel Islands and the Isle of Man by law, or, if no express provision is made then in and before the courts and in the manner in which the like offences, fines, proceedings, and warrants may be prosecuted, recovered, taken, or issued therein by law, or as near thereto as circumstances admit, and the bailiff or his lieutenant, or any jurat of the Royal Court in the Island of Jersey or the Island of Guernsey, and the judge or any jurat of the Court of Alderney, and the high bailiff or two justices of the peace in the Isle of Man, shall respectively be substituted for a justice of the peace.

6. This Act shall continue in force until the thirty-first day of July, nineteen hundred and six, and no longer, unless Parliament otherwise determines. (It was renewed until December 31st, 1909, and has since been extended from year to year by the Expiring Laws Continuance Act.)

B The following Order in Council is dated February 29th, 1908:—

(1) The Wireless Telegraphy Act, 1904, shall apply to British ships whilst on the high seas, provided that a person on board a British ship which is registered in any British possession (other than the Channel Islands and the Isle of Man), or in any British Protectorate, shall not be deemed to commit an offence against the Wireless Telegraphy Act, 1904, by reason of the installation or working of wireless telegraphy on such ship if the authority in such Possession or Protectorate, having power by law so to do, shall have granted a licence for the installation and working of apparatus for wireless telegraphy on that ship, and if such person is acting in accordance with the provisions of such licence.

(2) The Interpretation Act, 1889, shall apply for the purpose of the interpretation of this Order as it applies for the purpose of the interpretation of an Act of Parliament.

(3) This Order shall be published in the *London Gazette*, and shall come into operation immediately from and after the expiration of three months after this Order is so published.

(4) This Order may be cited as "The Wireless Telegraphy Order, 1908."

C An Order was issued in 1908 (No. 496) containing regulations relating to foreign ships:—

1. In these Regulations unless the context otherwise requires—

"Wireless Telegraphy" has the same meaning as in the Wireless Telegraphy Act, 1904.

"Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

"Territorial Waters" means such part of the sea adjacent to the coast of the British Islands as is deemed by international law to be within the territorial sovereignty of His Majesty, and includes harbours.

"Harbour" includes harbours properly so called, whether natural or artificial estuaries, navigable rivers, piers, jetties, and other works in or at which ships can obtain shelter, or ship and unship goods or passengers.

2. When communications are made by means of wireless telegraphy between a foreign ship in territorial waters and a wireless telegraph station in the British Isles, the rules in force for the working of wireless telegraphy at that station shall be observed.

3. All apparatus for wireless telegraphy on board a foreign ship in territorial waters shall be worked in such a way as not to interrupt or interfere with—

(*a*) Naval Signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the British Islands or the territorial waters abutting on the coast of the British Islands, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

4. (1) Except with the special permission in writing of the Postmaster-General no apparatus for wireless telegraphy on board a foreign ship (other than a ship of war) shall be worked or used whilst such ship is in any harbour in the British Islands.

(2) Without prejudice to the operation of the general provisions of these Regulations, the use of wireless telegraphy on board a foreign ship of war while in a harbour in the British Islands shall be subject to such rules (whether prohibitive or regulative) as may be made by the Admiralty from time to time.

5. (1) If at any time in the opinion of one of His Majesty's Principal Secretaries of State an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, and notice to that effect is published by the Postmaster-General, after the publication of such notice and until further notice the use of wireless telegraphy on board foreign ships whilst in territorial waters shall be subject to such rules as may be made by the Admiralty from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

(2) Such notice as aforesaid shall be published in the *London Gazette*, the *Edinburgh Gazette*, and the *Dublin Gazette*, and in such other manner, if any, as to the Postmaster-General may seem fit.

6. (1) Any person who shall offend against any provision of these Regulations or of any Rules made by the Admiralty thereunder shall be liable on conviction under the Summary Jurisdiction Acts for every such offence to a penalty not exceeding ten pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy installed or worked on board the ship on which the offence was committed shall be seized and forfeited.

(2) For the purposes of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any foreign ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

(3) Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

7. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

8. These Regulations shall come into operation on the first day of July, 1908.

9. These Regulations may be cited as "The Wireless Telegraphy (Foreign Ships) Regulations, 1908."

D The following is a copy of the form of Licence granted by the Postmaster-General to establish Wireless Telegraph Ship Stations:—

LICENCE TO ESTABLISH WIRELESS TELEGRAPH SHIP STATIONS.

To all to whom these Presents shall come

I, The Right Honourable

His Majesty's Postmaster-General, send greeting:

Whereas by reason of the provisions of the Telegraph Acts 1863 to 1916 and the Wireless Telegraphy Order 1908 it is unlawful to establish any wireless telegraph station or instal or work any apparatus for wireless

telegraphy in any place or on board any British ship (whether in the territorial waters of the British Islands or on the high seas) except under and in accordance with a licence granted in that behalf by the Postmaster-General :

And whereas —— (hereinafter called the Licensee) has applied to the Postmaster-General for the grant of a Licence to establish instal and work apparatus for wireless telegraphy as defined in Section 1 (7) of the Wireless Telegraphy Act 1904 at the ship station or stations mentioned in the Schedule hereto.

Now I the above-named —— His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee during the term or period commencing on the day of the date hereof and continuing thereafter so long as the Defence of the Realm (Consolidation) Regulations 1914 shall remain in force licence and permission—

(i) To establish instal and work for the purposes hereinafter mentioned at the ship station or stations specified in the Schedule hereto apparatus for wireless telegraphy of the kind specified in the Schedule hereto (which apparatus is hereinafter referred to as "the licensed apparatus") :

Provided that—

(*a*) Each ship station shall be of such class mentioned in Article XIII. of the Service Regulations annexed to the Radiotelegraph Convention 1912 as is specified in the said Schedule opposite to the name of such station :

(*b*) The apparatus installed at each ship station shall be of the character specified in the said Schedule opposite to the name of such station ;

(*c*) The sending apparatus used at each ship station shall be of such a character that the waves emitted are as pure and as little damped as possible and the receiving apparatus used at the said station or stations shall be of such a character as to afford the greatest possible protection from disturbance during the reception of signals ;

(*d*) The apparatus shall include such emergency installation as may be required according to the class of the ship station under the provisions of Article XI. of the Service Regulations annexed to the Radiotelegraph Convention 1912, and such control switch as may be required by the Admiralty ;

(*e*) The licensed apparatus shall be so constructed as to be capable of using wavelengths of 600 and 300 metres in length as measured by the standard of measurement in use by the Post Office for the time being and such other wave-lengths not exceeding 600 metres in length as shall be authorised in writing from time to time by the Postmaster-General. Provided always that the wave-length of 600 metres shall normally be used for communication and further that the wave-length of 1,800 metres may be used for transmission in the exceptional case contemplated by Article XXXV (2) (*a*) of the Service Regulations annexed to the Radiotelegraph Convention 1912 :

Provided further that only the wavelength of 600 metres (except as directed by the Admiralty) shall be used by the Licensee during the period of any war in which the United Kingdom is engaged ;

(*f*) The apparatus shall admit of the transmission and reception of messages at the rate of not less than 20 words a minute five letters being counted as one word ;

(ii) To send and receive messages by means of the licensed apparatus between the said ship stations and also between the said ship stations and coast stations and other ship stations. Provided that the Licensee shall not except with the consent in writing of the Postmaster-General send or receive messages from and at the said ship stations when in any harbour in the British Islands ; and

(iii) To receive money or other valuable consideration for or in respect of the use of the licensed apparatus or for or in respect of the transmission or receipt of messages by means of the said apparatus.

And I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions :

1. In these presents (and in the Schedule hereto) the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say) :—

The expression "the Postmaster-General" means the Postmaster-General for the time being.

The expression "wireless telegraphy" has the same meaning as in the Wireless Telegraphy Act 1904.

The term "telegraph" has the same meaning as in the Telegraph Act 1869.

The expression "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether a coast station or a ship station.

The expression "the Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

The expressions "the International Telegraph Convention" and "the International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated the 10th 22nd July 1875 and the Service Regulations made thereunder and include respectively any modifications of the Convention or Regulations made from time to time.

The expression "the Radiotelegraph Convention 1912" means the Convention signed at London on the 5th day of July 1912 and the Service Regulations made thereunder and includes any modification of the Convention or Regulations made from time to time.

The expression "coast station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

The term "ship station" means a wireless telegraph station established on board a ship which is not permanently moored.

2. On and after the day of 19 the installation and maintenance of each of the ship stations mentioned in the Schedule hereto by the Licensee shall subject to the provisions of this Licence be deemed compulsory in accordance with the provisions of Regulation 37B of the Defence of the Realm (Consolidation) Regulations 1914.

3. The licensed apparatus shall not be used by the Licensee or by any other person

either on behalf or by permission of the Licensee for the despatch or receipt of messages except messages authorised by this Licence.

4 (1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with Naval signalling.

(2) If the Admiralty are of opinion that the working of the licensed apparatus at any ship station specified in the Schedule hereto is inconsistent with the free use of Naval signalling the Licensee shall when required in writing by the Postmaster-General so to do close the said station.

(3) These provisions for the protection of Naval signalling shall be construed to be without prejudice to the generality of any other provisions of this Licence.

5. For the purpose of this Licence the Licensee shall observe the International Telegraph Convention and the International Telegraph Regulations so far as the said Convention and Regulations are capable of being applied to wireless telegraphy in common with ordinary land and submarine telegraphy.

6. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts 1863 to 1916 by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business so far as the same are applicable to the Licensee.

7. The Licensee shall observe the provisions of the Radiotelegraph Convention 1912.

8. The Licensee shall comply with all such directions and observe all such rules as may be given or made by the Postmaster-General from time to time for the purpose of preventing interference with the working of any other wireless telegraph station and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station.

9. The Licensee shall comply in all respects with all such directions and regulations as may from time to time be given or made by the Admiralty.

10. The licensed apparatus shall not without the consent of the Postmaster-General be altered or modified in respect of any of the particulars mentioned in the Schedule thereto.

11. The Licensee shall at all times indemnify the Postmaster-General against all actions claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

12. (1) Subject to the provisions of this Licence the Licensee shall transmit messages by means of the licensed apparatus on equal terms without favour or preference whether as regards rates of charge order of transmission or otherwise. Provided always that signals of distress and messages in connection therewith shall receive priority over all other messages and that the order of transmission of such other messages shall be governed by the International Telegraph Regulations.

(2) In respect of messages transmitted on behalf of His Majesty's Government or the Government of any British Possession or Protectorate the Licensee shall charge rates not in excess of half of the rates charged to the ordinary public.

13. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and shall answer such requests and signals and send them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

14. (1) The licensed apparatus at each of the ship stations mentioned in the Schedule thereto shall be worked only by operators holding certificates issued by the Postmaster-General and the Licensee shall provide for the working of each station at least two such operators.

(2) Certificates will be granted to persons of such technical proficiency and will be in such form and will be subject to such conditions as the Postmaster-General shall from time to time prescribe and they may be endorsed or withdrawn at the discretion of the Postmaster-General in accordance with the conditions to which the Certificates are respectively subject.

15. The Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus. The Licensee shall exhibit at each of the ship stations specified in the Schedule hereto a copy of Section 11 of the Post Office (Protection) Act 1884 and any contravention of that section by any person in the employment of the Licensee shall be deemed to be a breach of the provisions of this Licence.

16. The Licensee shall keep full accounts records and registers of all messages transmitted by means of the licensed apparatus and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and of ultimate destination and such further particulars as the Postmaster-General shall from time to time reasonably require to be shown messages on His Majesty's service being in such registers distinguished from other messages. The Licensee shall preserve all used message forms written and printed and transcripts of messages and all other papers for a period of at least fifteen months counting from the month following that in which the radiotelegrams were handed in as prescribed by the Radiotelegraph Convention 1912 and such registers and message papers shall be open to the inspection of the Postmaster-General or his officers thereto authorised at the registered office of the Licensee for the time being or at such other place as may be agreed between the hours of 10 a.m. and 5 p.m. on every day except Sunday or a statute or general holiday.

17. The Licensee shall render to the Postmaster-General such accounts as the Postmaster-General shall direct in respect of all charges due or payable under the Radiotelegraph Convention 1912 in respect of messages exchanged between the ship stations hereby licensed and coast stations and shall pay to the Postmaster-General at such times and in such manner as the Postmaster-General shall direct all sums which shall be due from the Licensee under such accounts.

18. The Postmaster-General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the ship stations hereby licensed for the purpose of inspecting and may inspect any apparatus fixed or being in such stations respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations respectively and

the working and user of such apparatus and telegraphic instruments respectively.

19. The Licensee shall carry on every ship on which a ship station is established under this Licence a print or copy of the Licence certified under the hand of an appropriate officer of the Postmaster-General to be a true copy and shall produce such print or copy for inspection if required to do so by the competent authorities of the countries where the ship calls. The Licensee shall also carry on every such ship such documents as may be prescribed by the Postmaster-General for the purpose of enabling the Licensee to communicate with coast stations and ship stations in accordance with the Radiotelegraph Convention 1912.

20. (1) The Licensee shall pay to the Postmaster-General for and in respect of the Licence hereby granted a royalty of five shillings per annum in respect of each ship station at which the licensed apparatus is installed.

(2) The said royalty shall be payable on the 1st of December in each year during which the Licence remains valid.

21. Except with the consent in writing of the Postmaster-General the Licensee shall not assign underlet or otherwise dispose of or admit any other person or body to participate in the benefit of the licences powers or authorities hereby granted or any of such licences powers or authorities.

22. (1) Inasmuch as an emergency has arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for any Naval Military Customs or Police Officer or any other person authorised by the Admiralty to take possession of the licensed apparatus or any part thereof in the name and on behalf of His Majesty and to use the same for His Majesty's service and any such officer or person so authorised may enter upon any ship on which any such apparatus is installed and take possession of the said apparatus and use the same as aforesaid and subject to such use may use the same or allow it to be used for such ordinary services as may in his discretion seem fit to him or may prohibit and take steps to prevent the use of the same and issue directions which shall be obeyed by the Licensee to prevent such use.

(2) Any such officer or person so authorised as aforesaid may instead of taking possession of the licensed apparatus as aforesaid direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct and such persons may enter upon any ship on which any apparatus is installed accordingly or the said officer or person so authorised as aforesaid may direct the Licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said officer or person so authorised as aforesaid may prescribe and the Licensee shall obey and conform to all such directions.

(3) The Licensee shall be entitled to reasonable compensation for any damage to the licensed apparatus arising in consequence of the exercise of the powers conferred by this clause.

23. Nothing in these presents contained shall prejudice or affect the right of the Postmaster-General from time to time to establish extend maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit neither shall anything herein contained prejudice or affect the right of the Postmaster-General from time to time to enter into agreements for or to grant licences relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of the United Kingdom by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit. And (save as in this Licence expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Postmaster-General by or under the Telegraph Acts or any of them.

24. Any notice request or consent (whether expressed to be in writing or not) to be given by the Postmaster-General under these presents may be under the hand of any one of the Secretaries or Assistant Secretaries for the time being of the Post Office and may be served by sending the same in a registered letter addressed to the Licensee at the registered office for the time being of the Licensee or if such notice request or consent relates to any particular ship station by delivery to the master of the ship upon which such station is installed and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Secretary of the Post Office at the General Post O ce London.

As Witness my hand and seal this day of One thousand nine hundred and • .

Signed sealed and delivered by
On behalf of the Postmaster-General in the presence of

THE SCHEDULE OF SHIP STATIONS BEFORE REFERRED TO.

1. Name of Ship on which Station established.	2. Class of Ship Station under the Radiotelegraph Convention 1912.	3. Nature of Services performed.	4. Hours of Service.	Normal Range of Signalling in Nautical Miles.		Character of Apparatus.		9. Qualification of Operator.	10. Power.		11. If Alternator is used, Number of Cycles per Second.
				5. By Night.	6. By Day.	7. System of Radio-telegraphy with the Characteristics of the System of Emission.	8. Wave lengths (in Metres).		Source and Maximum Output.	Maximum to be taken by sending instruments.	
							600 and 300.	*See* Clause 14 of the Licence.			

LICENCE TO USE WIRELESS TELEGRAPHY FOR PRIVATE BUSINESS.*

Whereas E of in the county of (hereinafter called "the Licensee") is desirous of establishing installing working and using a system of wireless telegraphy as defined in section 1 (7) of the Wireless Telegraphy Act 1904:

And whereas by reason of the provisions of the Telegraph Acts 1863 to 19 it is unlawful to establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place except under and in accordance with a licence granted in that behalf by the Postmaster-General and it is also unlawful save as in the said Acts provided to transmit telegrams within the United Kingdom:

And whereas at the request of the Licensee I have agreed to grant to the Licensee the licences powers and authorities hereinafter expressed and contained for the period upon the terms and subject to the stipulations and conditions hereinafter appearing:

Now I the above-named His Majesty's Postmaster-General in exercise of all powers and authorities enabling me in this behalf do hereby grant to the Licensee during the term or period commencing on the day of the date hereof and terminating on the 31st day of December 191 license and permission—

(i.) to establish and instal work at the stations specified in the Schedule hereto apparatus for wireless telegraphy (hereinafter called "the licensed apparatus") provided that the apparatus installed at each station shall be of the character specified in the said Schedule opposite to the name of such station; and

(ii.) to transmit and receive messages on the private business of the Licensee by means of the licensed apparatus between the said stations.

And I do hereby declare that the said licence and permission is granted on and subject to the following conditions and provisions:

1. In these presents (and in the schedule hereto) the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say):—

The expression "the Postmaster-General" means the Postmaster-General for the time being.

The expression "wireless telegraphy" has the same meaning as in the Wireless Telegraphy Act 1904.

The term "telegraph" has the same meaning as in the Telegraph Act 1869.

The expression "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

The expression "the Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

Apparatus shall be deemed to be "syntonised" when the transmitting apparatus is so adjusted as to communicate with a receiver which has a corresponding adjustment and to produce as little effect as possible on a receiver not having a corresponding adjustment.

2. (1) The licensed apparatus shall not be used by the Licensee or by any person either on behalf or by permission of the Licensee for any purpose except for the transmission and receipt of such messages as aforesaid between and at the stations specified in the Schedule hereto.

(2) No money or other valuable consideration shall be received by the Licensee or by any other person with the authority or by the permission of the Licensee in respect of the transmission or receipt of any messages by means of the licensed apparatus or any part thereof.

3. (1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with naval signalling.

(2) Whenever the operators at any signal station of the Licensee perceive through the medium of the instruments used by them that naval signalling is proceeding they shall refrain from using the licensed apparatus until all indication that naval signalling is proceeding shall have ceased.

(3) The Licensee shall if so required in writing by the Admiralty cease to use the licensed apparatus for such period (not exceeding two hours in any one day) as may be specified by the Admiralty.

(4) If the Admiralty are of opinion that the working of the licensed apparatus at any station specified in the Schedule hereto is inconsistent with the free use of naval signalling the Licensee shall when required in writing by the Postmaster-General close the said station.

(5) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of this licence.

4. The Licensee shall observe the provisions of any Regulations from time to time made under the provisions of the Telegraph Acts 1863 to 19 by the Postmaster-General with the consent of the Treasury in relation to the conduct of wireless telegraph business.

5. (1) The Licensee shall so work the licensed apparatus as not to interfere with the working of any wireless telegraph station established in the British Islands or the territorial waters abutting on the coasts of the British Islands (whether on shore or on any ship) by or for the purposes of the Postmaster-General or any department of His Majesty's Government or for commercial purposes and in particular with the transmission or receipt of any messages between or at wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

(2) With a view to preventing such interference as aforesaid the Licensee shall comply with all directions which shall be given to the Licensee by the Postmaster-General and with all rules prescribed by the Postmaster-General for observance by his Licensees—

(*a*) With respect to all arrangements to be adopted for the purpose of securing syntonised apparatus or for enabling the messages exchanged by means of the licensed

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* **The terms of this Licence are no longer operative, and a new form of Licence is likely to be issued shortly.**

apparatus to be distinguished from those emanating from any other wireless telegraph station;

(b) With respect to any alternation of messages which the Postmaster-General may think necessary; and

(c) Generally with respect to avoiding interference between one wireless telegraph station and another.

6. The licensed apparatus shall not without the consent in writing of the Postmaster-General be altered or modified in respect of any of the particulars mentioned in the Schedule hereto.

7. The Licensee shall at all times indemnify the Postmaster-General against all actions, claims and demands which may be brought or made by any corporation company or person in respect of any injury arising from any act licensed or permitted by these presents.

8. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

9. Subject to the provisions of this licence the Licensee shall not divulge to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and not intended for receipt by means of the licensed apparatus.

10. The Postmaster-General and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the stations or other premises in the possession or occupation of the Licensee either solely or jointly with any other person or persons for the purpose of inspecting and may inspect any apparatus fixed or being in such places respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such places respectively, and the working and user of such apparatus and telegraphic instruments respectively.

11. (1) All apparatus used or intended to be used by the Licensee shall be so erected fixed placed and used as not either directly or by reason of the working or user thereof to interfere with the efficient or convenient maintenance working or user of any telegraphic line of the Postmaster-General which may from time to time exist or which it is probable that the Postmaster-General may have occasion to erect place fix or use or to expose any such line to risk of damage or to risk of interference with the efficient or convenient working or user thereof.

(2) In case any telegraphic line of the Postmaster-General shall be damaged or the efficient working or user thereof shall be wholly or partially interrupted or otherwise interfered with and the Engineer-in-Chief for the time being of the Post Office shall certify in writing under his hand that such damage interruption or interference has been caused directly or indirectly by any apparatus used or intended to be used by the Licensee or by anything done by or on behalf of the Licensee in relation thereto the Licensee shall on demand pay to the Postmaster-General all costs that shall be reasonably incurred by him in repairing such damage and in removing or altering such telegraphic line so as to restore the same to efficient working order and in adding thereto or substituting therefor either temporarily or permanently any other telegraphic line if the said Engineer-in-Chief shall certify that such addition or substitution is reasonably required.

(3) For the purposes of this Article the expression "telegraphic line" has the same meaning as in the Telegraph Act 1878 and the expression "telegraphic line of the Postmaster-General" includes a telegraphic line belonging to or worked by the Postmaster-General or constructed or maintained by him for any Department of the Government or other body or person.

12. (1) The Licensee shall pay to the Postmaster-General on the 1st day of December next for and in respect of the licence hereby granted a royalty of £ per annum in respect of each station.

(2) In the event of the renewal of this licence the said royalty shall be payable on the same day in each succeeding year.

13. Except with the consent in writing of the Postmaster-General the Licensee shall not assign underlet or otherwise dispose of or admit any other person or body to participate in the benefit of the licences powers or authorities hereby granted or any of such licences powers or authorities.

14. If and whenever in the opinion of one of His Majesty's Principal Secretaries of State an emergency shall have arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for the said Secretary of State by warrant under his hand to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service and in that event any person authorised by the said Secretary of State may enter upon the stations offices and works of the Licensee or any of them and take possession thereof and use the same as aforesaid.

15. The Postmaster-General may at any time in his absolute discretion give notice in writing to determine these presents and the licence or permission hereby given at the end of one calendar month from the date of such notice and at the expiration of that period the licence or permission hereby granted shall cease and determine accordingly but without prejudice to any remedy of the Postmaster-General under any condition or provision herein contained.

16. In any of the following cases (that is to say):—

(a) In case any sum of money which ought to be paid by the Licensee to the Postmaster-General under or by virtue of these presents shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(b) In case of any breach non-observance or non-performance by or on the part of the Licensee of any of the provisions (other than a provision for the payment of money) or conditions herein contained;

then and in any such case the Postmaster-General may by writing under his seal revoke and determine these presents and the licences powers and authorities hereinbefore granted and each and every of them and thereupon these presents and the said licences powers and

authorities and each and every of them shall absolutely cease determine and become void.

Provided always that no such revocation or determination as aforesaid shall prejudice or affect any right of action or remedy which shall have accrued or shall thereafter accrue to the Postmaster-General under any condition or provision herein contained.

17. Nothing in these presents contained shall prejudice or affect the right of the Postmaster-General from time to time to establish extend maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit neither shall anything herein contained prejudice or affect the right of the Postmaster-General from time to time to enter into agreements for or to grant licences relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of the United Kingdom by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit and (save as in this licence expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Postmaster-General by or under the Telegraph Acts or any of them.

18. Any notice request or consent (whether expressed to be in writing or not) to be given by the Postmaster-General under these presents may be under the hand of any one of the Secretaries or Assistant Secretaries for the time being of the Post Office, and may be served by sending the same in a registered letter addressed to the Licensee at the usual or last known place of residence or business of the Licensee, and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Secretary of the Post Office at the General Post Office, London.

F In October, 1912, the Board of Trade, at the request of the Lords Commissioners of the Admiralty, issued a notice directing the attention of Masters and Owners of British Merchant Vessels to the necessity for arranging for periodical practices in Wireless Telegraphy communications between H.M. Ships of War and Ships of the British Mercantile Marine for the purpose of ensuring efficient and reliable communication when required.

The co-operation is invited of all British ship-owners and masters whose ships are fitted with wireless telegraphy, in order to give effect to the following proposals:—

(1) At 8.30 a.m. and 2.30 p.m. daily any single man of war (destroyers and small craft excluded) or one man of war in a fleet in company, detailed by the Senior Naval Officer present, will adjust her wireless telegraphy transmitting and receiving apparatus to the commercial 600 metre wave-length and make the call "CCCC," followed by her own commercial call sign, indicating that she is prepared to carry out an exercise with any British merchant ship within range.

On a British merchant ship receiving this call she will answer and say whether or not she is prepared to proceed with the exercise. Should more than one merchant ship answer, the man of war will indicate which is to exercise and which is to wait.

The exercise will then proceed, but no messages are to be exchanged which are not authorised by the respective captains and masters of the ships practising. No message received during such exercises is to be forwarded beyond the ship actually receiving the message and no payment for any message can be made. The exercises are to be considered as strictly on Service and not for any commercial advantage.

(2) In all such exercises the man of war is to be considered the controlling ship.

(3) The exercises will cease at 9.15 a.m. and 3.15 p.m. respectively, or before, at the discretion of the captains concerned.

(4) These exercises are only to be carried out between vessels neither of which is within 150 miles range of any commercial shore station using the 600 metre wave-length, and are to cease at once should one of H.M. ships so direct.

MERCHANT SHIPPING (CONVENTION) ACT, 1914.

G An Act to make amendments of the law relating to Merchant Shipping as are necessary or expedient to give effect to an international Convention for the Safety of Life at Sea, signed in London on January the twentieth, nineteen hundred and fourteen, and for purposes incidental thereto.

(10th August 1914)

PART III.

(Which deals with Wireless Telegraphy.)

15. (1) Subject to the provisions of this Act every British ship registered in the United Kingdom which carries 50 or more persons shall be provided with a wireless telegraphy

THE SCHEDULE.

1.	Normal Range of Signalling.		Character of Apparatus.		6. Power.		7.
Name of Station	2. By Night.	3. By Day.	4. Description of Receiving Apparatus.	5. Wave Lengths (in Metres).	Source and Maximum Output.	Maximum to be taken by Transmitting Instruments.	If Alternator is used, No. of Cycles per Second.

installation, and shall maintain a wireless telegraphy service which shall be at least sufficient to comply with the rules made for the purpose under this Act, and shall be provided with certified operators and watchers at least in accordance with those rules. Provided that the obligations imposed by this section shall not come into operation until such date, not being less than six months after the making of those rules, as may be specified in the rules.

(2) In reckoning the number of persons carried on a ship for the purpose of this section, persons shall not be counted who are exceptionally and temporarily carried on a ship—

(*a*) As the result of *force majeure*; or

(*b*) as the result of the necessity of increasing the number of the crew to fill the places of members of the crew who are ill or disabled; or

(*c*) as the result of the obligation on the part of the master to carry shipwrecked persons, or persons in like circumstances; or,

(*d*) if so provided by rules of the Board of Trade, as cargo hands for a part of the voyage not being between one continent and another and not being, during the time the hands are carried, outside the limits of latitude thirty degrees north and thirty degrees south.

(3) If this section is not complied with in the case of any ship, the master or owner of the ship shall be liable in respect of each offence to a fine not exceeding five hundred pounds, and any such offence may be prosecuted summarily, but if the offence is prosecuted summarily the fine shall not exceed one hundred pounds.

16. (1) The Board of Trade, in consultation with the Postmaster-General, shall make such rules with respect to wireless telegraphy installations and service on British ships which are registered in the United Kingdom and with respect to the carrying on those ships of operators and watchers for the purposes of wireless telegraphy, as appear to them necessary or expedient to carry into effect the provisions of the Convention mentioned in Part V. of the Third Schedule to this Act.

(2) The Board of Trade may by rules made under this section exempt from the obligations of this Act as to wireless telegraphy—

(*a*) Ships while on voyages the course of which does not take the ship more than a hundred and fifty sea miles from the nearest coast, if the Board are satisfied that the route and the conditions of the voyage are such as to render compliance with those obligations unreasonable or unnecessary; and,

(*b*) sailing ships on which, owing to the peculiar or primitive nature of their build, it is impossible to provide a proper wireless telegraphy installation.

(3) The Board of Trade may by rules made under this section provide that any automatic calling apparatus which is certified by them to be efficient and to have been accepted by the parties to the Convention may be substituted, for the purposes of the provisions of this Act and any rules made thereunder relating to wireless telegraphy, for a certified operator or watcher.

17. The Board of Trade may postpone the operation of the provisions of this Act relating to wireless telegraphy as respects any particular ship for such period as the Board of Trade determine in each case, if it is shown by the owners of the ship that they have taken all reasonable steps to comply with the provisions of this Act as respects the ships, but that they have been unable to do so owing to difficulties in obtaining delivery of any wireless telegraphy apparatus or of obtaining the service of certificated operators or watchers.

The period of postponement under this section shall not exceed one year in the case of ships which are required in pursuance of the Convention to provide a first-class wireless telegraphy service, and two years in the case of ships which are so required to provide a third-class wireless telegraphy service, and in the case of ships which are so required to provide a second-class wireless telegraphy service, shall not exceed one year as respects the provision of a wireless telegraphy installation and two years as respects the provision of a continuous watch.

EXTRACT FROM THE DEFENCE OF THE REALM (CONSOLIDATION) REGULATIONS, 1914.

H 22. No person shall, without the written permission of the Postmaster-General, make, buy, sell, or have in his possession, or under his control, any apparatus for the sending or receiving of messages by wireless telegraphy, or any apparatus intended to be used as a component part of such apparatus; and no person shall sell any such apparatus to any person who has not obtained such permission as aforesaid, and any person having in his possession or under his control any such apparatus, whether with or without the permission of the Postmaster-General, shall on demand deliver the apparatus to the Postmaster-General, or as he may direct; and if any person contravenes the provisions of this regulation he shall be guilty of an offence against these regulations.

If the competent naval or military authority has reason to suspect that any person having in his possession any apparatus for sending or receiving messages by telegraphy, wireless telegraphy, telephony, or other electrical or mechanical means is using, or about to use, the same for any purpose prejudicial to the public safety or the defence of the realm, he may, by order, prohibit that person from having any such apparatus in his possession, and may take such steps as are necessary for enforcing the Order, and if that person subsequently has in his possession any apparatus in contravention of the Order he shall be guilty of an offence against these regulations.

For the purposes of this regulation any apparatus ordinarily used as a distinctive component part of apparatus for the sending or receiving of messages by wireless telegraphy shall be deemed to be intended to be so used unless the contrary is proved.

EXTRACT FROM *THE LONDON GAZETTE*, DATED 28TH JULY, 1916.

I Whereas by an Order in Council dated the twenty-eighth day of November, nineteen hundred and fourteen, His Majesty was pleased to make regulations (called the "Defence of the Realm (Consolidation) Regulations, 1914") under the Defence of the Realm Consolidation Act, 1914, for securing the public safety and the defence of the realm:

And whereas the said Act has been amended by the Defence of the Realm (Amendment) Act, 1915, the Defence of the Realm (Amend-

ment) (No. 2) Act, 1915, and the Munitions of War Act, 1915:

And whereas the said regulations have been amended by various subsequent Orders in Council:

And whereas it is expedient further to amend the said regulations in manner hereinafter appearing:

Now, therefore, His Majesty is pleased, by and with the advice of His Privy Council, to order, and it is hereby ordered, that the following amendments be made in the said regulations:

N.B.—Paragraphs 1, 2, 3, and 5 of this Statutory Order deal with matters other than Radiotelegraphy, to which Clause 4, which follows, alone refers.

4. After regulation 37A the following regulation shall be inserted:—

"37B (1) Every British ship of three thousand tons gross tonnage or upwards in respect of which a licence to instal wireless telegraph apparatus has been granted by the Postmaster-General, and which puts to sea from a port in the United Kingdom after a date to be specified in such a licence, shall be provided with a wireless telegraph installation, and shall maintain a wireless telegraph service, and shall be provided with a certified operator, together with suitable accommodation for the apparatus and operator:

"Provided that where a licence has been granted in respect of a ship before the making of this regulation, this obligation shall apply as if the twenty-first day of August, nineteen hundred and sixteen, were the date specified in the licence.

"(2) Application to the Postmaster-General in a form prescribed by him for such a licence shall, unless a licence has before the making of this regulation been granted in respect of the ship, be made—

(a) in the case of a ship of such tonnage as aforesaid registered in the United Kingdom, by the owner thereof on or before the twenty-first day of August nineteen hundred and sixteen; and

(b) in the case of a British ship of such tonnage as aforesaid, registered elsewhere than in the United Kingdom, by the master of the ship within two days from the arrival of the ship in the United Kingdom next after the making of this regulation.

"(3) The Postmaster-General shall, as and when wireless telegraph apparatus and the services of operators become available for the purpose, cause licences to be issued in respect of such ships as in the opinion of the Admiralty should in the national interests be fitted with such apparatus, and the licences shall specify the date as from which the carrying of such apparatus under this regulation is to be compulsory, the character of the apparatus, and the qualifications of the operator.

"(4) The Postmaster-General may—

(a) extend the time mentioned in the licence as the time within which any apparatus is to be provided; and

(b) exempt any ship from the obligations imposed by this regulation.

"(5) If the provisions of this regulation or the terms of any licence granted thereunder are not complied with in the case of any ship, the master or owner of the ship shall be guilty of a summary offence against these regulations, and if any master or owner fails to make an application in accordance with this regulation he shall be guilty of a summary offence against these regulations, and in either case if the ship is at any time subsequently found at a port of or within the territorial waters adjoining the United Kingdom, the ship may be seized and detained.

"(6) In this regulation expressions have the same meaning as in the Merchant Shipping Acts, 1894 to 1914."

AMENDMENT OF THE DEFENCE OF THE REALM REGULATIONS.

THE 23RD DAY OF OCTOBER, 1917.

Published in The London Gazette, Friday, 26th October, 1917.

J

6. Regulation 37B shall be amended by the substitution of the following sub-sections for sub-sections (1) (2) and (3) thereof:—

"(1) Every British seagoing ship of sixteen hundred tons gross tonnage or upwards in respect of which a licence to instal wireless telegraph apparatus has been granted by the Postmaster-General shall be provided with a wireless telegraph installation, and shall maintain a wireless telegraph service, and shall be provided with two certified operators, together with suitable accommodation for the apparatus and operators."

"(2) Application to the Postmaster-General in a form prescribed by him for such a licence shall, unless a licence has before the making of this regulation been granted in respect of the ship, be made as follows:—

(a) As regards every such ship which is registered in the United Kingdom, by the owner on or before the thirteenth day of November, nineteen hundred and seventeen:

(b) As regards every such ship which is registered elsewhere than in the United Kingdom, by the master within two days after the date on which the ship first arrives in the United Kingdom after the twenty-third day of October, nineteen hundred and seventeen."

"(3) The Postmaster-General shall, as and when wireless telegraph apparatus and the services of operators become available for the purpose, cause licences to be issued in respect of such ships as in the opinion of the Admiralty should in the national interests be fitted with such apparatus, and the licences shall specify the date as from which the carrying of such apparatus under this regulation is to be compulsory, the character of the apparatus, and the qualifications of the operators."

K

EXTRACTS FROM SUPPLEMENT TO *THE LONDON GAZETTE*, OF TUESDAY, THE 29TH OF APRIL, 1919.

Wednesday, 30th April, 1919.

Air Ministry.

AIR NAVIGATION REGULATIONS, 1919.

ORDER OF THE SECRETARY OF STATE UNDER THE AIR NAVIGATION ACTS, 1911 TO 1919.

In pursuance of the powers conferred upon me by the Air Navigation Acts, 1911 to 1919, and all other powers enabling me in that behalf, I, the Right Honourable Winston Spencer Churchill, one of His Majesty's Principal Secretaries of State, by order make the following regulations:—

GENERAL CONDITIONS OF FLYING.

1. No aircraft shall fly within the limits of the British Islands and the territorial waters

adjacent thereto unless the following conditions are complied with :—

. . . .

(6) No mails shall be carried without the consent in writing of the Postmaster-General, and no wireless apparatus shall be installed or worked except under and in accordance with a licence granted by the Postmaster-General, containing such conditions as may be approved by the Secretary of State :

. . . .

PRODUCTION OF LICENCES, CERTIFICATES AND LOG-BOOKS FOR INSPECTION.

6.—(1) Any member of the personnel of an aircraft shall on demand produce his licence for the inspection of any person authorised for the purpose by the Secretary of State.

(2) The owner and person in charge of any aircraft shall, on demand, produce for the inspection of any person authorised for the purpose by the Secretary of State, any certificates or licences relating to the aircraft, and also, in the case of passenger or goods aircraft, any of the prescribed log-books.

EXCEPTIONS.

8. These regulations do not, except where otherwise expressly stated, apply—

(*a*) to military aircraft belonging to or employed in the service of His Majesty ; or

(*b*) to any aircraft or to any persons if and to such extent as such aircraft or persons may be excepted from these regulations, or any of them, by direction of the Secretary of State on the recommendation of a Government Department.

PENALTIES.

10.—(1) Where any aircraft flies in contravention of, or fails to comply with, these regulations or any provision thereof, the owner of the aircraft, and also the pilot or commander, shall be deemed to have contravened or, as the case may be, failed to comply with these regulations :

Provided that it shall be a good defence to any proceedings for contravention or failure to comply with these regulations if the contravention or failure is proved to have been due to stress of weather or other unavoidable cause.

(2) If any person obstructs or impedes any person acting under the authority of the Secretary of State in the exercise of his powers and duties under these regulations, such first-mentioned person shall be deemed to have acted in contravention of these regulations.

(3) Any person contravening or failing to comply with these regulations or any provision thereof is liable to imprisonment for a term not exceeding six months or to a fine not exceeding two hundred pounds, or to both such imprisonment and fine.

(5) If any person in any aircraft is guilty of any act of espionage to which the provisions of section one of the Official Secrets Act, 1911, apply, he is liable to penal servitude for a term not exceeding seven years.

INTERPRETATION.

12. In these regulations, unless the context otherwise requires—

"Aircraft" includes airships and flying machines, all balloons, whether fixed or free and kites ;

. . . .

"Military aircraft" includes naval, military, and air-force aircraft ;

. . . .

"Personnel" (in relation to any aircraft) includes any pilot, commander, navigator, and engineer, and any operative member of the crew ;

. . . .

The Interpretation Act, 1889, applies for the purpose of the interpretation of these regulations as it applies for the purpose of the interpretation of an Act of Parliament, and as if these regulations were an Act of Parliament.

SHORT TITLE.

14. These regulations may be cited as the Air Navigation Regulations, 1919.

WINSTON S. CHURCHILL,
One of His Majesty's Principal Secretaries of State.

Air Ministry, London,
30th April, 1919.

L CIRCULAR TO OWNERS AND MASTERS OF BRITISH MERCHANT SHIPS.

WIRELESS TELEGRAPHY IN MERCHANT SHIPS—RELAXATION OF RESTRICTIONS.

II. *Restrictions on Use of Wireless Telegraphy.*

1. All restrictions on the use of wireless telegraphy in ships are removed, except in the following waters :—

Baltic.
Black Sea and Sea of Marmora.

2. In the above waters wireless telegraphy communications are permitted as follows :—

(i) Between masters and owners on matters concerning the safety and working of the ship.

(ii) Between masters and naval authorities. Messages must be in code. A special code is supplied for this.

(iii) Official messages from accredited Ministers or Officials of H.M. Governments, or Officers of the Nava or Military Forces travelling in their official capacities as passengers on board, to Government departments, or Naval or Military authorities on shore. Should such officials require to send messages of any other description, they should be shown these instructions as constituting the Master's authority for refusing to have messages despatched.

(iv) *Private telegrams* are forbidden.

It should be borne in mind that stations belonging to foreign Governments are not yet all open to public correspondence.

3. In order to avoid delay in making distress signals whilst in the above waters the Master is responsible that the wireless telegraphy office is informed whenever the vessel enters any of these zones. Whilst in these zones the operator is to be kept supplied, while on watch, with the position of the vessel. This is to be communicated to the operator in writing, and is to be corrected every half-hour.

4. Outside the waters named in par. 1 private messages are admitted.

Note.—Owners wishing to divert their ships by wireless should now send the necessary message *direct*, and *not* through the Director Mercantile Movements as heretofore.

This Circular cancels and replaces Section XXXII of "Admiralty Instructions for British Merchant Ships" (Addendum of 25th August, 1919, and Circular of 31st July, 1919.)

Naval Staff,
Admiralty,
Nov. 22nd, 1919.

MERCHANT SHIPPING (WIRELESS TELEGRAPHY) ACT, 1919. CHAPTER 38.

AN ACT TO MAKE FURTHER PROVISION WITH RESPECT TO WIRELESS TELEGRAPHY ON SHIPS.

August 15th, 1919.

Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1.—(1) Every seagoing British ship registered in the United Kingdom being a passenger steamer or a ship of sixteen hundred tons gross tonnage or upwards shall be provided with a wireless telegraph installation, and shall maintain a wireless telegraph service which shall be at least sufficient to comply with the rules made for the purpose under this Act, and shall be provided with one or more certified operators and watchers, at least in accordance with those rules:

Provided that the Board of Trade may exempt from the obligations imposed by this Act any ships or classes of ships if they are of opinion that, having regard to the nature of the voyages on which the ships are engaged, or other circumstances of the case, the provision of a wireless telegraph apparatus is unnecessary or unreasonable.

(2) The Board of Trade, in consultation with the Postmaster-General, shall make rules prescribing the nature of the wireless telegraph installation to be provided, of the services to be maintained, and the number, grade, and qualifications of operators and watchers to be carried:

Provided that no ship shall be required to carry more than one operator unless more than one operator would have been required under the provisions of the Merchant Shipping (Convention) Act, 1914.

(3) If this section is not complied with in the case of any ship, the master or owner of the ship shall be liable in respect of each offence to a fine not exceeding five hundred pounds, and any such offence may be prosecuted summarily, but, if th offence is prosecuted summarily, the fine shall not exceed one hundred pounds.

(4) A surveyor of ships or a wireless telegraphy inspector may inspect any ship for the purpose of seeing that she is properly provided with a wireless telegraph installation and certified operators and watchers in conformity with this Act, and for the purpose of that inspection shall have all the powers of a Board of Trade inspector under the Merchant Shipping Acts, 1894 to 1916.

If the said surveyor or inspector finds that the ship is not so provided, he shall give to the master or owner notice in writing pointing out the deficiency, and also pointing out what in his opinion is requisite to remedy the same.

Every notice so given shall be communicated in the manner directed by the Board of Trade to the chief officer of customs of any port at which the ship may seek to obtain a clearance or transire, and the ship shall be detained until a certificate under the hand of any such surveyor or inspector is produced to the effect that the ship is properly provided with wireless telegraph installation and certified operators and watchers in conformity with this Act.

(5) The obligations imposed by this Act shall not come into operation while the obligations with respect to wireless telegraphy on ships imposed by the Defence of the Realm Regulations remain in force, but shall be in addition to, and not in substitution for, the obligations as to wireless telegraphy imposed by the Wireless Telegraphy Act, 1904, or any Order in Council, or regulations made thereunder, or by the Merchant Shipping (Convention) Act, 1914.

2. The foregoing provisions of this Act shall, as from a date three months after the coming into operation of the obligations imposed by this Act on British ships registered in the United Kingdom, apply to ships other than British ships registered in the United Kingdom while they are within any port in the United Kingdom in like manner as they apply to British ships so registered.

3.—(1) This Act may be cited as the Merchant Shipping (Wireless Telegraphy) Act, 1919, and the Merchant Shipping Acts, 1894 to 1916, and this Act may be cited together as the Merchant Shipping Acts, 1894 to 1919.

(2) This Act shall be construed as one with the Merchant Shipping Act, 1894, and "passenger steamer" shall mean a steamer which carries more than twelve passengers, and "wireless telegraphy inspector" means an officer appointed under section twenty of the Merchant Shipping (Convention) Act, 1914, for the purposes therein mentioned.

(N.B.—This act will operate as soon as the detailed rules provided for therein have been made.)

EXPERIMENTS IN WIRELESS TELEGRAPHY.

AUTHORITY FOR SENDING AND RECEIVING.

Summary of Conditions of Issue.

(Note:—All Sending Stations must also be equipped for reception.)

1. Applicants must produce evidence of British nationality and two written references from persons of British birth and of standing, not related to them.

2. Installation to be approved by Postmaster-General.

3. Secrecy of correspondence to be observed.

4. Applicants must satisfy the Postmaster-General that they have in view some definite object of scientific value or general public utility. If scientific research is intended they should be certified as competent investigators by a Government Department or some recognised scientific body.

5. Applicants will normally be required to show that they have attained:—

(a) A sufficient knowledge of the adjustment and operation of the apparatus which they wish to work;

(b) A knowledge of the regulations of the International Convention in so far as they relate to the prevention of interference and impose certain duties on all wireless operators (these are contained in Section V. of the Postmaster-General's Hand-Book for Wireless Operators which is sold by the Stationery Office);

(c) An operating speed of at least 12 words (Morse) a minute, sending and receiving.

A fee of 5s. will be charged in connection with this arrangement.

A licensee may be allowed, exceptionally, to employ a certificated operator, whose name should be furnished.

6. It is proposed to charge small fees to cover clerical expenses and expenses of inspection, etc.

7. Communications will be authorised only

with specified stations not exceeding five in number.

8. *Aerials.*

The maximum height and dimensions allowed are as follows :—Extreme height of aerial above ground, 100 feet ; total length of wire (including leading-in wires), 100 feet for single-wire aerial, 140 feet of wire where two or more wires are used (*e.g.*, total length of 70 feet of double wire).

9. *Portable Stations.*

General conditions same as for fixed stations.

Power of portable sending stations will usually be limited to 10 watts.

Use will ordinarily be authorised only within 10 miles of a fixed point.

O EXPERIMENTS IN WIRELESS TELEGRAPHY.

Authority for the Use of Receiving Apparatus Only.

Conditions of Issue, etc.

Formal licences to conduct experiments in wireless telegraphy cannot at present be granted ; but, pending the settlement of certain outstanding questions, the Postmaster-General is prepared to authorise the use of wireless apparatus for the reception of signals on the following conditions :—

(1) The applicant shall produce evidence of his British nationality and two written references. (A certificate of birth should be furnished if possible ; but this will not be insisted upon if the two referees testify of their own knowledge that the applicant is of British nationality. The references should be given by persons of standing, who are British subjects and not related to the applicant.)

(2) There shall be no divulgence to any person (other than properly authorised officials of His Majesty's Government or a competent legal tribunal) or any use whatever made of any message received by means of the apparatus ;

(3) The installation shall be subject to the approval of the Postmaster-General ;

(4) The aerial shall not exceed the undermentioned maximum height and dimensions :—

Extreme height of aerial above ground, 100 feet.

Total length of wire, including leading-in wires, 100 feet for single-wire aerial ; 140 feet of wire where two or more wires are used—*e.g.*, total length of 70 feet of double wire.

(5) Thermionic valves shall not be used without the special authority of the Postmaster-General ;

(6) The apparatus shall be open to inspection at all reasonable times by properly authorised officers of the Post Office ;

(7) A fee of 10s. shall be paid. (It is contemplated that an annual charge of 10s. shall be made in respect of each experimental receiving licence to cover the expenses of the issue of the licence and the inspection of the station.)

Procedure to be Followed.

The applicant * should furnish

(*a*) a formal acceptance of the foregoing conditions ;

(*b*) evidence and references as described in (1) ;

(*c*) his full Christian names and particulars of his occupation ;

(*d*) a remittance of 10s. ;

(*e*) a description of the apparatus which it is proposed to instal, and, if authority is desired for the use of thermionic valves, a diagram of the circuits in which they would be used ;

(*f*) a sketch showing the form, height, and dimensions of the proposed aerial (including leading-in wires) ;

(*g*) the address at which the apparatus would be installed.

If it is desired to purchase wireless apparatus for use under the prescribed conditions full particulars of the apparatus, and the name and address of the firm from which it is proposed to obtain it, should be furnished, in order that a permit for its purchase, may, if necessary, be issued. Any receiving apparatus belonging to the applicant which is in Post Office custody will be returned to him as soon as authority is granted for its use.

* N.B.—If the applicant is a minor the authority to use wireless apparatus can only be issued in the name of his parent or guardian, who should comply with the requirements set forth above and state his (or her) full address and relationship (if any) to the applicant. Evidence should also be furnished, as indicated in condition (1), of the minor's British Nationality. There is no objection to a minor working the authorised apparatus as the agent of his parent or guardian.

P EXTRACT FROM CONVENTION RELATING TO INTERNATIONAL AIR NAVIGATION (1919) :—

Art. 14.—No wireless apparatus shall be carried without a special licence issued by the State whose nationality the aircraft possesses. Such apparatus shall not be used except by members of the crew provided with a special licence for the purpose.

Every aircraft used in public transport and capable of carrying ten or more persons shall be equipped with sending and receiving wireless apparatus when the methods of employing such apparatus shall have been determined by the International Commission for Air Navigation.

This Commission may later extend the obligation of carrying wireless apparatus to all other classes of aircraft in the conditions and according to the methods which it may determine.

GREECE

ONE of the oldest maritime countries in the world, the kingdom of Greece lies in latitude 30° 50′ to 41° 0′ N. ; its longitude stretching between 19° 20′ and 26° 15′. The country consists of the southern part of the Balkan Peninsula, and of islands in the Ægean, Mediterranean and Ionian seas. Its official area is estimated at 24,822 square miles.



CONTROL.

Land Stations are a State monopoly for the present, no licence having been granted to any individual or private company so far, but private companies or individuals may, under licence, erect and work wireless installations on merchant vessels.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
M. Repoulis	Minister of the Navy ..	Pipinou Str. 81, Athens
Capt. C. Athanasiadis.. ..	Head of the Radiotelegraphic Service	Nikis Str. 45, Athens
Com. L. Teocharis	First Assistant to Head of Radiotelegraphic Service.	Panepistimiou Str. 53, Athens
Sub. Lieutenant E. Karkatzis	Second Assistant	Wireless Station, Athens

ORGANISATION.

The Greek Ministry of the Navy, following the lead of other countries, took up the question of wireless seriously in 1909, when Capt. Athanasiadis, the present head of the Radio Service, an officer of the Navy, was sent to England at the head of a mission for the construction of different stations. The first wireless station was erected at Athens and completed in February, 1911, and several other stations were installed on ships of the Navy. It was only during the Balkan War (1912-1913) that other land stations were erected, the Athens station being the only land station in Greece up to that moment.

The whole organisation of radiotelegraphy in Greece is shortly to be placed on a new basis, but particulars are not yet available.

The Société Anonyme Internationale de Télégraphie sans Fil of Brussels is the only company erecting and working stations on merchant vessels.

Wireless Societies or Clubs.—The Union of Greek Wireless Telegraphists is the only organisation of persons interested in wireless.

The following is a summary of the wireless stations under the control of the above authorities :—

Land Stations under the Ministry of the Navy ...	15
Under construction	3
Ship stations for public service	20
Ship stations on naval vessels	32

ADMINISTRATION.

The political troubles from which Greece has only recently emerged tended to stultify progress; but the new Government has taken matters vigorously in hand, and has passed a law rendering wireless equipment compulsory for all vessels over 1,000 tons in the service of the Greek Government. The text of this law, as well as of the law relating to operators, and of the Form of Ship's Licence, will be found below :—

A—Law passed October 8th, 1917, relative to the Installation of Wireless on Merchant Ships.

B—Law passed October 8th, 1917, dealing with the Appointment and Qualifications of Radiotelegraphists.

C—Form of Ship's Licence.

LAW RELATING TO SHIP STATIONS.

A ART. 1.—Greek Government vessels of 300 tons dead weight and over, as well as cargo vessels of 1,000 tons and upwards, must be equipped with wireless telegraph apparatus, possessing a range of 100 miles, and furnished with emergency apparatus with a radius of not less than thirty miles. These installations must fulfil the technical conditions laid down for the service of wireless telegraphy on board vessels of war.

ART. 2.—Starting with January 1st, 1918, any vessel falling under the categories above referred to in Art. 1, which are not fitted with wireless telegraphy, shall be forbidden to clear from Greek ports; and owners violating this clause shall be summarily punished, either by decision of the Minister for the Navy, without any right of appeal, after due denouncement on the part of the competent Port Authorities, or shall be mulct of a fine amounting to 5,000 francs (an amount which shall be liquidated in accordance with the law governing Procedure against Creditors of the State), and the delinquents shall at the same time be sentenced to three months' imprisonment.

By Royal Decree and by the administrative action on the part of the Minister for the Navy, the operation of the above clauses may be postponed.

ART. 3.—On passenger vessels of a smaller tonnage than 300 tons, the State may instal for the period of the war wireless telegraph apparatus which is the property of the State. In this case the shipowners shall only be liable for the expense of suitably preparing and arranging the vessels for the installation and working of the radiotelegraphic apparatus. In such cases, moreover, the Government is at liberty at any time to remove such equipment without becoming liable to any indemnity in favour of the shipowners.

ART. 4.—For the duration of the present war the personnel required for the working of ship stations shall form part of the Royal Navy in accordance with Articles 1 and 3 of the current law. Shipowners are bound to provide suitable rationing and quarters for the radiotelegraphists on similar lines to those provided in the Royal Navy of Greece, as well as rationing and quarters for men in the Royal Naval Service who may be located on board their vessels in pursuance of the orders of the Minister of the Navy, whether they be employed for working the installations or for other service with regard to men or equipment. Such rationing and quarters shall be provided in accordance with the rank of the persons affected.

The regular pay and allowances for all men belonging to the Royal Navy mentioned in the above paragraph shall be liquidated by the State. This pay and allowances shall be handed to them at the end of each month on behalf of the Minister for the Navy, and in accordance with his instructions, by the captains of the vessels at whatever place they may happen to be at the time.

The clauses above enumerated come into force on September 1st, 1917.

ART. 5.—In the event of shipowners finding it impossible to provide the necessary apparatus for the vessels which form the subject of the above Article 1, the Government shall procure such apparatus and shall instal the station. In such cases the shipowners shall be obliged to recoup the Government for their expenditure on the apparatus and shall repay the cost of installation to the State Exchequer.

In case of any refusal on the part of shipowners to liquidate the expense incurred, this payment shall be enforced by the application of the clauses relative thereto in the laws governing the procedure against creditors of the State.

ART. 6.—The present law shall take effect from the date of its publication in the *Government Gazette* dated at Athens October 8th, 1917.

LAW

FOR REGULATING THE STATUS AND CLASSIFICATION OF RADIOTELEGRAPHISTS DURING THE WAR.

B ART. 1.—The rank of Quartermaster Telegraphists may be granted for the duration of the present war, in accordance with the Royal Decree of January 31st, 1912, entitled "For the Institution of a Wireless Telegraph Service, etc." (modified by the subsequent Decree of April 26th, 1912, and the Royal Decree of May 17th, 1912), to a number in excess of that which had been originally fixed, and to an extent

in accordance with the needs of the service. Candidates for this rank must possess the qualifications laid down in Article 11 of the Royal Decree of January 31st, 1912 (modified by the Royal Decree of April 26th, 1912). They must have attained the age of seventeen years and not exceed the age of twenty-five years.

For those who have passed the age of twenty years it is indispensable that they should have served their time with the Military Forces of the Crown, or that they should be in course of so serving.

To the above-mentioned rank there are also admitted persons who are not Greek subjects, provided that such persons have declared, or do declare, themselves desirous of obtaining Greek nationality, and under the proviso that they are in possession of the necessary qualifications, as well as within the age mentioned in the second paragraph of this article.

ART. 2.—The direct conferring of the rank of Quartermaster Telegraphist to men in excess of the number fixed by statute referred to above may only be effected in the case of young men in possession of a radiotelegraphic diploma for mercantile vessels, or who hold a certificate from a private radiotelegraphic school. Before being admitted they must pass the examination obligatory for students at the Special Preparatory Wireless School of the Greek Navy.

Such individuals must have attained the age of not less than seventeen years, and not more than twenty-five years, and must not have been subject to the penalties laid down by Articles 21 and 22 of the Penal Code.

In the event of their being over twenty years, they must have performed their term of military service, or be in course of so doing.

ART. 3.—All such individuals as are above referred to must be classed as of Temporary Rank, in accordance with Articles 1 and 2. They must remain in the service of the Royal Navy for the whole duration of the present war, and for any period in excess thereof which may be fixed by the Minister for the Navy in accordance with the requirements of the service. They are also subject to dismissal from the service on the initiative of the Minister for the Navy (after consultation with their superior officers) either on the grounds of bad conduct or incapacity.

Their service in the Royal Navy shall reckon as part of their term of Compulsory Military Service, except in the event of dismissal for bad conduct or incapacity, or on account of their failure to pass the qualifying examinations.

Non-Commissioned Telegraphist Officers may, on the recommendation of their superiors (if approved by the Minister for the Navy), receive a fixed appointment for five years to vacant positions of full telegraphists.

ART. 4.—Authority is hereby given for the appointment of a special instructor, either a Greek or foreign subject, to give tuition in the Preparatory School for Wireless Telegraphy for the duration of the war, at a salary amounting to 200 drachmas per month. After the closing of the school this instructor may be retained in the service of the State at the same salary during the duration of the present war in the capacity of inspector of Wireless Installations on Merchant Ships.

ART. 5.—A further Royal Decree shall define the uniform to be worn by students and others, in accordance with the provisions of the present law.

ART. 6.—This law shall come into force immediately on its publication in the *Government Gazette*, dated at Athens, October 8th, 1917.

FORM OF SHIP'S LICENCE.

C Kingdom of Greece. No.....
Ministry of the Navy.
Department of Wireless Telegraphy.

LICENCE

FOR THE INSTALLATION AND OPERATING OF WIRELESS TELEGRAPH STATIONS.

In accordance with Royal Decree dated April 16th, 1916, permission is hereby given for the installation and operating of a wireless telegraph station class............ on board the ship .... of .... tons, registered at .... subject to the technical conditions laid down in the regulations annexed to the International Radiotelegraphic Convention and the observance of the regulations mentioned therein.

Athens, this..........191 .

Minister of the Navy.

GRENADA

(See map on p. 295.)

GRENADA, and the chain of small islands called the Grenadines, lie between 12° 30′ and 11° 58′ N. latitude, whilst their longitude is included between 61° 20′ and 61° 35′ W. The total area of the Colony is estimated at about 85,120 acres. Originally settled by the French, it was definitely ceded to Great Britain in 1783. The control is vested in the Governor, an Executive Council, and a Legislative Council, both consisting partly of nominated and partly of official members. There are no wireless clubs or societies in the Colony.

ADMINISTRATION.

Wireless telegraphy is regulated by the following Ordinances and Regulations :—

A—Wireless Telegraph Ordinance, 1903.
B—Wireless Telegraph Amendment Ordinance, 1913.
C—Regulations of February 1st, 1913.
D—Regulations of August 3rd, 1914.
E—Regulations of August 20th, 1918.

WIRELESS TELEGRAPH ORDINANCE 1903.

A In this Ordinance the term "Wireless Telegraphy" means any system or installation designed or constructed for the transmission or receipt of any messages or communications to or from a distant place by means of electric currents and signals generated by any apparatus or instrument which system, installation or instrument is unconnected by wire or other tangible attachment with such distant place. The term "Wireless Telegram" means any message or communication transmitted, or intended for transmission, by wireless telegraphy.

2. The Governor-in-Council and the servant of the Government of the Colony shall have the exclusive privilege of installing, erecting, maintaining, and using in this Colony apparatus intended for wireless telegraphy, and also the incidental services of transmitting, receiving collecting or delivering wireless telegrams.

3. It shall not be lawful for any person to instal, erect, maintain or use in this Colony any apparatus or instrument for the purpose of wireless telegraphy without having previously obtained from the Governor a licence in that behalf to be granted on such terms and conditions as the Governor may prescribe.

4. Any person contravening the provisions of this Ordinance shall be liable on conviction to a fine not exceeding Fifty Pounds, and the apparatus and installation in respect of which a conviction is obtained may by order of the Magistrate before whom such conviction is obtained be forfeited to the use of His Majesty the King.

5. All proceedings under this Ordinance may be taken before the Magistrate of the Southern District or any other person appointed by the Governor for the purpose of hearing and deciding the case; and the mode of procedure shall be according to the law in force for the time being in respect of other offences punishable on summary conviction.

6. This Ordinance may be cited as "The Wireless Telegraph Ordinance."

THE WIRELESS TELEGRAPH AMENDMENT ORDINANCE, JANUARY 15TH, 1913.

B Be it enacted by the Governor with the advice and consent of the Legislative Council of Grenada as follows:

1. The Governor-in-Council may make regulations.

(*a*) Prescribing the form and manner in which applications for licences under the principal Ordinance are to be made and the fees payable on the grant of any such licence;

(*b*) Governing the use of wireless telegraph apparatus on merchant ships, whether British or foreign, while in the territorial waters of the Colony; and

(*c*) Generally for the purpose of carrying the principal Ordinance into effect.

2. Any person committing a breach of any regulation made under this Ordinance shall be liable on summary conviction to a fine not exceeding Twenty Pounds.

3. (1) This Ordinance may be cited as the Wireless Telegraph Amendment Ordinance, 1913, and shall be read as one with the Wireless Telegraph Ordinance, and may be cited therewith as the Wireless Telegraph Ordinances, 1911 and 1913.

(2) The Wireless Telegraph Ordinance is herein referred to as the principal Ordinance.

Passed the Legislative Council this tenth day of January, in the year of our Lord one thousand nine hundred and thirteen.

C. LIVINGSTON WILSON,
Clerk of Councils.

REGULATIONS WITH RESPECT TO THE USE OF WIRELESS TELEGRAPH APPARATUS ON MERCHANT SHIPS.

(Gazetted February 1st, 1913.)

C Under the authority of section one of the Wireless Telegraph Ordinance, 1913, the following regulations are hereby made by the Governor-in-Council:—

1. In these regulations the expression "merchant ship" means any merchant ship, whether British or foreign.

2. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph established on ships at sea.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such a ship is in any of the harbours of the Colony except with the special or general permission of the Colonial Postmaster.

4. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

5. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Made by the Governor-in-Council this 31st day of January, 1913.

C. LIVINGSTON WILSON,
Clerk of Councils.

REGULATIONS MADE BY THE GOVERNOR.

(Gazetted August 3rd, 1914.)

D Whereas it is provided by section 4 (3) of the Wireless Telegraphy Ordinance, 1913, that if at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time; and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

And whereas in my opinion such emergency as aforesaid has arisen:

Now I do hereby make the following further regulations—namely:

1. The Governor may appoint any person to take possession and control of the apparatus

for wireless telegraphy on board of any merchant ship while in the territorial waters of the Colony.

2. Any person so appointed may enter upon any such ship and take possession of the aforesaid apparatus thereon on behalf of His Majesty, and use the same for His Majesty's service and subject thereto for such ordinary services as to the said person may seem fit.

3. Any such person may instead of taking possession of such apparatus as aforesaid direct the master of the ship to submit or cause to be submitted to him all messages intended for transmission or arriving by the said apparatus or any class or classes of such messages, to stop or delay the transmission of any message or deliver the same to him, and generally to obey all such directions with reference to the transmission of messages as such persons may prescribe, and the master of the ship shall obey and conform to all such directions. Any master failing to obey and conform to any such direction shall be liable on summary conviction to the penalties under the Ordinance provided.

Made by me under the provisions of the Wireless Telegraphy, 1913, this third day of August, 1914.

DOUGLAS YOUNG,
Acting Governor.

REGULATIONS WITH RESPECT TO THE USE OF WIRELESS TELEGRAPHY ON SHIPS IN THE TERRITORIAL WATERS OF THE COLONY.

(Gazetted August 20th, 1918.)

Under and by virtue of a Royal Order in Council dated the 26th day of October, 1896, and of three amending Orders in Council dated respectively the 14th day of October, 1913, the 20th day of August, 1914, and the 21st day of March, 1916, the Governor hereby makes the following regulations:—

1. In these regulations, unless the context otherwise requires, the expression "ship" includes all ships whether of British or foreign register and the warships of neutral Powers, but does not include British warships or warships of the Allied Powers.

2. The radiotelegraph stations on board ships shall not be worked whilst such ships are within the territorial waters of the Colony.

3. British and Allied merchant ships and warships of neutral Powers in the territorial waters of the Colony must completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, in such a manner as to show that they are properly disconnected.

4. Foreign merchant ships (other than Allied merchant ships) must take down their aerial wires completely and disconnect the same from their radio apparatus: Provided that any such merchant ship remaining in the territorial waters of the Colony for less than twelve hours may, at the discretion of the Governor, be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of regulation 3 of these regulations.

5. The Governor may, at his discretion, order that the operating room on board any ship shall be sealed or that any other step be taken which is necessary to prevent the radio station on board such ship from being used.

6. Any person acting in contravention of these regulations or any order made by the Governor under these regulations shall be liable on summary conviction to imprisonment with or without hard labour for a term not exceeding six months, or a fine not exceeding £100, or both such imprisonment and fine.

7. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or in charge of any ship shall be deemed to have authorised and to be responsible for any act in contravention of these regulations or any order made thereunder.

8. Any order made or any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship to which the order relates or on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

Made by the Governor this 17th day of August, 1918.

G. B. HADDON-SMITH,
Governor.

GUAM

(See map on p. 129.)

GUATEMALA

THE Republic of Guatemala lies south-eastward of Mexico, and is almost shut off from the Atlantic Ocean by British Honduras on the north and by the Republic of Honduras on the south-east. Puerto Barrios and Livingston constitute the chief ports of the Republic on the Atlantic seaboard; San José (the chief port), Champerico and Ocos on the Pacific. The Republic in its present form was established on March 21st, 1847, after having formed part, for 26 years of the Confederation of Central America. The Constitution dates from December, 1879, modified in 1885, 1887, 1889, and 1903.

CONTROL AND ORGANISATION.

At the present moment radiotelegraphy is represented by a private Government station at Guatemala City. This installation is nominally under the supervision of the Minister of Public Works, but is entirely under the personal direction of the President. An American operator named Mr.



J. H. Wicks, of the U.S. Navy, has been lent to the Government for the purpose of superintending the working.

ADMINISTRATION.

No laws and regulations have up to the present been issued in Guatemala to regulate the use of wireless.

HAITI

(See map on p. 372.)

THE Republic of Haiti occupies the western (French-speaking) portion of the island of San Domingo,* which ranks only second in size to Cuba amongst the West Indian Islands. Its area is estimated at 10,200 square miles.

CONTROL.

The Republic does not itself possess any wireless stations, and has passed no regulations affecting telegraphy. The various stations which do exist in the island all constitute items in the American occupation, and remain under the supervision of U.S.A. officials.

HAWAII

(See United States of America.)

HOLLAND

(See Netherlands.)

HONDURAS (BRITISH)

(See British Honduras.)

HONDURAS (REPUBLIC OF)

HONDURAS is a Republic, proclaimed September 15th, 1821, and is governed under a charter proclaimed October, 1894. The Legislative Power is in the hands of a Congress of Deputies of 42 members, chosen for four years directly by popular vote, in the ratio of one per 10,000 inhabitants. The executive authority rests with the President, nominated and elected by popular vote for four years. The number of electors is about 110,000. The Republic is administered by a Council of six ministers, with the portfolios of Foreign Relations, Government and Justice, War and Marine, Treasury and Public Credit, Public Works and Agriculture, and Education.

The area of the Republic is about 44,275 square miles, which lie between the Atlantic on the north and the Pacific on the south. The Atlantic coast line is the more important, as it forms the seat of the banana industry, and contains the only railroads in the country. The chief towns on the north coast are Puerto Cortes (the head of the railroad leading inland to San Pedro Sula, one of the most important towns in the country), Tela, La Ceiba,

* For Wireless Organisation and Laws current in the Dominican Republic see under Santo Domingo.

Trujillo, and Omoa. On the south coast Honduras has only a small coast line on the Gulf of Fonseca, with a port on Tiger Island called Amapala. This constitutes the chief port for the capital, Tegucigalpa, goods and passengers being carried across the gulf to the small port of San Lorenzo, and thence by automobile and oxcarts over the fine national highway to the capital, a distance of 80 miles.

CONTROL AND ORGANISATION.

The first wireless station was installed during 1912 at the port of La Ceiba by the Vaccaro Brothers Railroad and S.S. Company.

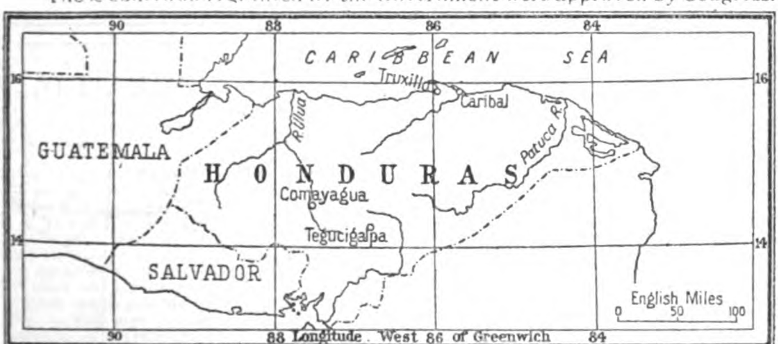
There are other stations at Cuyamel, Tela, and Trujillo.

All these stations belong to private companies, and are without any co-ordination, being used only by the various companies to maintain communication with their own steamers. Under favourable atmospheric conditions they can work with New Orleans, but ordinarily they communicate with the Isla del Cisne, in the Caribbean Sea. They are more or less of the type of that a Tela, which has a transmitter of 5 kw., and aerials sustained by towers 250 feet high.

According to the Law of Telegraphs of the Republic, this branch of Telegraphy is the exclusive right of the State, but this right has been made over to private companies on the north coast, in the form of concessions, under the following conditions :—

" The concessionaire has the right to construct, maintain, and use, in order to direct the service of his steamships, and those contracted by him, wireless stations ; these cannot be placed in public service without previous arrangement with the Government. Said Government shall have the right, in times of peace or of war, to use such installations, without remuneration for the concessionaire, and even to direct and control, exclusively, the service of same, by its own employees."

These concessions granted by the Government were approved by Congress.



The Government has recently ordered a course of wireless to be included in the studies of the Military School at Tegucigalpa, and has installed a teaching set. There are no manufacturing plants in the Republic.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Excmo. Señor Dr. don Manuel Sabina López	Secretario de Estado en el Despacho de Fomento, Obras Públicas y Agricultura	Tegucigalpa
Ingeniero Manuel A. Zelaya	Sub-Secretario de Estado en el Despacho de Fomento, Obras Públicas y Agricultura	Tegucigalpa

HONG-KONG

(See CHINA, FOREIGN SETTLEMENTS.)

HUNGARY

THE Republic of Hungary dates from the occupation of the country by the Magyars in the ninth century A.D. Constitutionally speaking, the method of government has hitherto been that of an aristocratic monarchy. According to the *Ausgleich* (in the Magyar tongue *Kiegyezés*), the compromise under which its relations with Austria were settled on December 21st, 1867, the two States were perfectly independent, being only united through the identity of the ex-Sovereign.

This independence is evidenced by the fact that the two countries Austria and Hungary, possessed separate Wireless Laws and Regulations, and their independence is now officially recognised under the terms of the Peace Treaties.

CONTROL.

Radiotelegraphy is at present controlled by the Director-General of Posts, Telegraphs and Telephones, who is responsible for the promulgation of all laws and regulations relative thereto.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mons. Joseph Hollós ..	Secretary of State and Director-General of Posts, Telegraphs and Telephones	Budapesth

ORGANISATION.

A large station, with a range of 3,000 km., situated at Csepel, near Budapesth, was established on November 18th, 1914, whilst a trial station has been erected at Budapesth itself. Wireless apparatus has been installed in many of the schools throughout the country. No stations exist for aviation or meteorological purposes



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ADMINISTRATION.

Radiotelegraphy is governed by the following law, the text of which is printed below :—

A—Decree No. 62574/13, dated October 16th, 1913.
B—Form of Ship Licence thereunder.
C—Form of Certificate for Ship Stations.
D—Form of Certificate for Operators.

DECREE OF THE HUNGARIAN MINISTER OF COMMERCE WITH REFERENCE TO THE FITTING UP OF WIRELESS STATIONS ON HUNGARIAN SEA-GOING PASSENGER SHIPS.

A In accordance with paragraphs 24 and 27 of the Supplement to my Order No. 60,805, issued on August 21st of the current year, in the matter of authorising the placing in service of commercial sea-going ships, the safety appliances provided on them and the provision of the navigation service in connection with working them, passenger liners already in service, which make regular voyages from Hungarian ports to points beyond Gibraltar or Aden and are carrying passengers, are to be fitted with wireless apparatus of the description specified below not later than by February 1st, 1915; new ships, on the other hand, must be fitted with such apparatus before they are put into service. Such apparatus must be sufficiently powerful to be able to send or receive messages under ordinary conditions over a minimum distance of 100 sea miles.

In order to carry out this decree I order the following :—

1. The owner (or charterer) is obliged to apply to the Hungarian Minister of Commerce for permission to establish a wireless station on board.

Such application must be accompanied in quadruplicate by a technical description of the apparatus to be used, with a diagram of the connections. Any subsequent alteration in the system, or remodelling of any description of the apparatus, which may affect its capacity for sending or receiving messages, must receive the preliminary authorisation of the Hungarian Minister of Commerce.

2. The arrangement of the wireless station on the ship must be up to date and comply with Rule 3 of the London International Wireless Agreement, so that the station may be able to work in harmony with the working of wireless stations using other systems and be able to exchange messages with such other stations. The system to be adopted and to be used will depend on the preliminary authorisation of the Hungarian Minister of Commerce.

The apparatus must be of such a type that it can be adjusted for waves 300 and 600 metres long and with these be able to send or receive 20 words at least per minute, counting five letters to the word.

In the case of applying subsections 2a to 2d of paragraph xxxv. of the London International Wireless Service Regulations, the apparatus on the ship will be allowed to make use also of wave lengths of 1,800 metres.

3. All the machinery and materials for fitting up the wireless station on the ship must be acquired in the home country as far as possible.

Machinery and materials to be used for such purpose may only be acquired from abroad with the special permission of the Hungarian Minister of Commerce. Service books and similar other stores and office requisites for the working of the wireless service will be supplied at cost price by the Chief Post and Telegraph Administration.

4. All ships fitted either for continuous or restricted wireless service must in addition to the usual apparatus be fitted also with apparatus for sending out wireless distress signals in conformity with Rule xl. of the London Wireless Service Regulations as ordered by and in a manner fixed by the Hungarian Minister of Commerce.

Such apparatus for sending out wireless distress signals must be provided with its own separate power supply independently of any other power supply not used for the wireless service on board and must be of a design that it can be put in action expeditiously and be kept at work continuously for at least six hours and at the same time be powerful enough to send signals over a distance of at least 80 sea miles, on ships having a continuous wireless service and over at least 50 miles on ships with restricted wireless service.

This special installation for sending out distress signals may be omitted on all ships on which the regular wireless installation is able to fulfil these requirements.

5. The speed at which signals can be sent and received will be set out by the Hungarian Minister of Commerce in the document granting permission to establish a wireless service on a ship.

As regards new inventions for materially improving the efficient working of the apparatus and the speed of sending and receiving messages, the Hungarian Minister of Commerce may compel the owner (or charterer) of the ship to adopt such invention or inventions within a fixed period for the wireless station on his ship with due regard to existing practical requirements and a fair consideration of the expenditure incurred in connection therewith.

6. Under ordinary conditions the electrical power for working the wireless apparatus may not exceed one kilowatt. A greater power than this may only be used if the nearest station on the coast with which it is desired to exchange messages is situated at a greater distance than 200 sea miles or if on account of obstacles extant it is necessary to use the larger power (London Wireless Service Regulations, Rule viii.).

7. The Chief Post and Telegraph Administration is empowered to have the wireless installation examined by its own inspectors at any period and to control the service.

The owner (or charterer) of the ship is obliged to afford to the inspectors of the Chief Post and Telegraph Administration, and with the intervention of this Administration to officers appointed by the Navy every facility to make themselves thoroughly familiar with the working in every detail of the wireless apparatus and gear and to acquire the necessary practice in working the apparatus.

Any stipulation on the part of the supplier of

the apparatus that certain parts or details of the apparatus are to be kept secret and not to be shown to the inspectors of the Chief Post and Telegraph Administration or to officers of the Navy must not be accepted by the owner (or charterer) of the ship.

All inspectors and naval officers deputed to control or learn the working of the apparatus must be carried on the ship cost free by the owner (or charterer) of the ship in a class corresponding to their rank (with cabin accommodation in accordance therewith also free) and to charge them for their board at cost price.

Not more than two such persons, however, may travel on these conditions on the same voyage.

8. The nature of the service of the wireless station on the ship (whether public or special service, etc.) and its duration (whether continuous, restricted or service without special fixed hours), also the number and qualification (1st class or 2nd class) of the wireless operators, will be set out by the Hungarian Minister of Commerce in the document granting permission for the installation.

9. The Hungarian Minister of Commerce reserves himself the right to suspend at any time the wireless service on the ship for an indefinite period or permanently or in respect of certain special classes of messages without divulging his reason for so doing or without rendering himself liable to the payment of an indemnity.

In the case of an order for mobilisation in the Hungarian Monarchy being issued or in the case of war the wireless service on the ship is to be suspended altogether unless the captain of the ship receives special instructions to the contrary from the Chief Post and Telegraph Administration.

The captain of the ship will be held personally responsible for the carrying out of this regulation.

In other respects in time of mobilisation or war the owner (or charterer) of the ship is bound to carry out the special orders to be issued for the occasion.

10. Wireless operators to be employed may only be Hungarian citizens with a blameless record who can speak and write the Magyar language thoroughly and have obtained a certificate of qualification as regards wireless operating from the examining committee appointed by the Hungarian Minister of Commerce for the purpose.

The individuals thus qualified are to take the oath of loyalty in the presence of the examining committee, such oath to include promises to attend to their duty and to keep all messages secret, the fact of their having taken the oath being recorded on their certificate of qualification.

The wireless operators on board are subject to the discipline on the ship, must each possess their service books, and are to be placed on the list of the crew.

The owner (or charterer) of the ship is only allowed to have such individuals trained for the wireless service who have been chosen by the Hungarian Chief Post and Telegraph Administration for such purpose from a preliminary list of candidates submitted to the Administration.

Every wireless operator whose certificate is cancelled by the Hungarian Post and Telegraph Administration is to be dismissed immediately.

The owner (or charterer) of the ship is bound to give immediate notice of any change in the personnel of wireless operators to the Chief Post and Telegraph Administration and to the Hungarian Naval Authorities.

11. Every wireless station established for public service may be used by the public for sending wireless messages against payment of the proper fees.

The tariff of fees for wireless messages is fixed by the Hungarian Minister of Commerce on the recommendation of the Company. These fees are retained by the owner of the wireless station on board.

12. Out of these fees received by the owner (or charterer) of the ship for wireless messages he is responsible for the portions due to the inland and foreign telegraph authorities for forwarding messages.

In administrative matters the owner (or charterer) of the ship, or the wireless station on board, may only communicate with foreign telegraph administrations or with the International Bureau at Berne of the Telegraph Association through the Hungarian Chief Post and Telegraph Administration.

13. In conformity with Rule 3 of the London Wireless Agreement the wireless station on board is bound to enter into communication with every wireless station ashore or established on any ships regardless of the system used by such stations for the purpose of exchanging messages, and in accordance with Rule 9 the wireless station on board is compelled to accept distress signals from any source whatever, to reply to these and to take the necessary steps.

Wireless stations established on ships are to pay particular attention to the working of stations on the coast. The wireless station on board is to be kept in perpetual and efficient working order in order to be able to keep up faultless communication with the coastal stations.

At the request of the coastal station the wireless station on board is bound to stop its message immediately.

14. The working of the wireless station on board and the accounting for the fees received by such station are to be governed by the London Wireless Agreement and the service regulations attached thereto, by the St. Petersburg Telegraph Agreement and the service regulations attached thereto, and also by any orders already issued or to be issued by the Hungarian Chief Post and Telegraph Administration.

The wireless station, or the shipowner (or charterer) respectively, is bound to conform with the legal enactments and orders issued with reference to matters relating to the telegraph, telephone and electric signals.

During a stay in foreign ports the wireless station on board is bound to conform with any special rules which may be in force in the country of its sojourn besides those prescribed by the International Wireless Agreement and the regulations attached thereto.

It is the duty of the shipowner (or charterer) to make himself acquainted with these.

15. As an acknowledgment of the sovereignty of the State and in order to defray expenses incurred in the ordinary control of the wireless station on board, the owner (or charterer) of the ship is bound to pay on the dates named, and at the receiviig offices named in the document granting permission for the establishment of the wireless station, twenty (20) crowns per station per annum.

Should it become necessary to institute an

inquiry owing to any neglect or fault on the part of the owner (or charterer) of the ship or one of his employees and should the enquiry establish any neglect or fault on the part of the owner (or charterer) or one of his employees, the owner (or charterer) will be bound to indemnify the Treasury for all expenses incurred in connection with such inquiry.

16. In every case of neglect or fault in or about the wireless service the Hungarian Chief Post and Telegraph Administration may mulct the owner (or charterer) of the ship in a penalty not exceeding 100 crowns provided such acts of neglect or fault do not constitute a misdemeanour or crime.

17. If after repeated warnings the wireless station on board should not do its duty, or if the working of the station should militate against public interests, the Hungarian Minister of Commerce is empowered to inflict a heavier penalty of 100 to 1,000 crowns or to issue orders to have the working of the wireless station entrusted to an individual appointed by the Minister at the expense and responsibility of the shipping undertaking, and at the same time the Minister is to have power to have all faults made good in the apparatus and have all necessary alterations made in the apparatus at the expense of the owner (or charterer) of the ship, or as an alternative to suspend or cancel the permit for the wireless station on board.

18. The permit for the establishment and working of a wireless station on board cannot be granted for a period exceeding 20 years.

At the expiration of the period mentioned in the document granting permission the whole installation with all its accessories (including furniture and fittings) and eventually also the installation for sending out distress signals are to be handed over to the Hungarian Post Office in fully efficient and faultless working condition free of charge and without liability.

Should the Hungarian Post Office not wish to take charge of the working of such wireless station thus come into their possession, but to leave it further in the hands of the owner (or charterer) of the ship, the owner (or charterer) is bound to pay twenty (20) crowns per annum over and above the fee mentioned in Clause 15 in acknowledgment of the right of ownership of the installation thus acquired by the State.

A permit given for the establishment of a wireless station on a ship is automatically cancelled by the putting out of commission of the ship and the owner (or charterer) of the ship is obliged to give notice of this to the Hungarian Chief Post and Telegraph Administration. Should it be desired to transfer the wireless installation to another ship a fresh permit for so doing will be required.

19. Moreover, the Hungarian Minister of Commerce has full power to cancel temporarily or permanently the permit for the working of a wireless station at any time even before the expiry of the period for which such permit has been granted and to cancel it without assigning any reason for his decision and to take over the working of the installation or to have it dismantled.

In the case of the working of the installation being taken over temporarily by the Ministry, the owner (or charterer) of the ship is bound to hand over for use free of charge and without any indemnity the whole of the installation with all the apparatus, fittings and stores for working same, also the cabin and locality in which the installation is housed, together with the sleeping cabins of the wireless operators; also to supply free of cost the power required for working the installation and supply the food, render all medical service and provide attendance and other necessities required by the operators. As against this, however, all fees paid for wireless messages will be handed over to the owner (or charterer) of the ship.

The terms of the final taking over of the installation are or will be specified in the permit or in the special order issued for the purpose.

Before the installation is taken over finally under the ordinary conditions six months' previous notice will be given, but the Hungarian Minister of Commerce reserves himself the right to shorten this period if public interests should necessitate this step or even to take over the installation at any time without any previous notice whatever.

20. Should, in the unchallengeable opinion of the Hungarian Minister of Commerce, public interests require it, the Hungarian Chief Post and Telegraph Administration may—through the courts of law and without incurring any liability in respect of claims for indemnity—issue orders for any vessel being fitted with wireless installation at the expense of the Treasury to have the service maintained and to have the installation dismantled when its use is no longer required by public interests and to arrange for certain compensation being arranged in connection therewith to the owner (or charterer) of the vessel.

21. The Hungarian Minister of Commerce reserves himself the right to grant exemptions from the above regulations from case to case in conformity with practical requirements.

Hungarian Minister of Commerce.
N. ....
V. 191.

Licence.

B Sec. 1.—The Minister grants a licence to
to instal a public wireless service station on his ship named
carrying passengers and to work such station during the period while this licence remains in force under the conditions specified below.

Sec. 2.—The person to whom this licence is granted is obliged to comply with the following :—

(*a*) With the provisions contained in Section XXXI of the Law of 1888 and with Decree No. 23445 issued in July 1890 for carrying out this law, as well as with Decree No. 62574 issued on October 16th 1913 for establishing wireless stations on Hungarian passenger ships.

(*b*) With the provisions of any law to be enacted in future as well as of any ministerial decree or order already issued or to be issued in future by the Hungarian Post Office with the same object in view.

(*c*) With the orders contained in the International Wireless Agreement and its service regulations.

(*d*) With the conditions laid down in the present licence.

Sec. 3.—The grantee is obliged to establish the installation on board in accordance with the "Telefunken" system in a manner complying in every respect with the requirements laid down in the Wireless Service Regulations, Rule III, sub-section 1 and 2, Rule VII, sub section 2 and Rule VIII.

The normal distance over which the installation is to be able to exchange messages is to

be at least 200 sea miles by day and at least 300 sea miles by night.

The normal wave-length of the installation is fixed by the Minister at 600 metres with the reservation laid down in Rules III and XXXV of the International Wireless Service Regulations.

SEC. 4.—The holder of this licence is obliged to instal besides the ordinary service installation on board an auxiliary installation in conformity with Rule XI of the International Wireless Service Regulations.

SEC. 5.—The holder of this licence undertakes to maintain permanently the two installations mentioned in sections 3 and 4 in good serviceable working condition and to introduce all mprovements in accordance with the progress made by the science of wireless telegraphy.

The Minister reserves himself the right to compel the holder of this licence to adopt al new inventions in wireless practice materially enhancing the reliability and speed of exchanging messages.

All machinery, apparatus and materials to be used in fitting up the installation on board are to be obtained inland as far as possible.

Machinery, materials and apparatus of this kind may only be obtained from abroad with the special sanction of the Hungarian Minister of Commerce.

SEC. 6.—The holder of this licence has no right to alter the system of the wireless installation on board mentioned in Section 3. Generally speaking the Minister's preliminary consent must be obtained for any alteration whatever in the installation as described in the technical description or in the diagram of connections both forming a complementary part of the present licence.

SEC. 7.—The holder of this licence and his employee in handling the wireless apparatus and maintaining the wireless service must act in conformity with the International Wireless Agreement and the Service Regulations attached thereto with the rate of telegraph fees and also with parts I and II of the telegraph service rules and the orders issued by the Chief Post and Telegraph Administration.

SEC. 8.—The Minister fixes the call signal of the station in the H A B group of letters, its character is to be a "P G station for public correspondence" in conformity with subsection 4 of Rule V of the Wireless Service Regulations. As regards hours of service the wireless station is to be classed in the second category—*i.e.*, stations with restricted hours of service in accordance with the provisions of Rule XIII, sub-section 3 of the Wireless Service Regulations.

The official hours are to be from 8 a.m. to 8 p.m.

In accordance with Rule XIII sub-section 3 of the International Wireless Service Regulations—during the periods of sailing over and above the official hours named—operators must be at their posts ready to receive messages and stay there permanently during the first ten minutes of every hour.

SEC. 9.—In conformity with the office hours fixed in section 8 the holder of this licence undertakes to employ at least one first-class operator for attending to the service of the wireless station on board in accordance with Rule X sub-section 2 and the Wireless Service Regulations.

SEC. 10.—This operator, like all other wireless employees, must be a Hungarian citizen of blameless character who is able to write and speak the Magyar language perfectly and is the holder of a certificate of qualification for wireless operating from an examining body appointed for the purpose by the Hungarian Minister of Commerce.

The qualified individuals must take the oath of loyalty in the presence of the examining body such oath to include promises of due attendance to their duties and to keep all messages secret, the fact of having taken this oath is to be testified in their certificate of qualification.

The employees in the service of the wireless station on board are subject to the discipline of the ship, they must be provided with service books of the ship and enrolled on the register of the crew.

As regards the wireless service these employees are subject also to the Chief Post and Telegraph Administration and must comply with the directions issued for the proper performanc of the service.

The owner (charterer) of the ship may only train such individuals for the wireless service whose training is permitted by the Hungarian Chief Post and Telegraph Administration after preliminary notice of such intended training has been gievn to the Administration.

Every wireless employee whose certificate is withdrawn by the Hungarian Chief Post and Telegraph Administration must be dismissed immediately.

The owner (or charterer) of the ship must give immediate notice of any change in the personnel of the wireless staff to the Chief Post and Telegraph Administration and also to the Hungarian Naval Authorities

In accordance with Rule X sub-section 4 of the Wireless Service Regulations "the service of the wireless station on board is under the chief supervision of the captain of the ship." Hence the holder of this licence must order the Captain of the ship to take the oath of loyalty and for the preservation of the secret of messages, before a representative of the Hungarian Post Office.

SEC. 11.—The wireless station is intended for public correspondence and may therefore be used by anybody for sending messages against payment of the prescribed fees and observance of the rules laid down for the telegraph service.

On the other hand, in accordance with Rule 3 of the International Wireless Agreement the wireless station on board must exchange wireless messages with any and every other such station on shore or afloat—irrespective of the system used by such stations for receiving or sending wireless messages.

The operators of the wireless station on board must refuse to accept any message which, if transmitted to any part of the territory of Hungary, may endanger the safety of the Hungarian State, or the contents of which may form a breach of the country's laws or offend against public order or morality.

Should the person handing in the message still insist on its transmission the captain of the ship is to be appealed to, whose decision in this matter is to be considered final.

SEC. 12.—The fee for transmitting a wireless message from the ship is fixed at 40 fillérs per rateable word with a minimum fee of 4 crowns per message.

The Minister however reserves himself the right to modify this rate of fees at any time even during the duration of this licence or to fix a new tariff for messages sent.

SEC .13.—The fees referred to in the previous

section may be retained by the holder of this licence.

Messages which at telegraph stations of the State are accepted for free transmission or are transmitted on the credit system must be accepted and transmitted by the holder of this licence on the same terms.

SEC. 14.—In dealing with telegrams and preparing accounts the wireless station on board must only use dating stamps, printed forms and books that are prescribed for use and are issued for this purpose by the Hungarian Post who will supply them to the holder of this licence at cost price on his written application to the Chief Post and Telegraph Administration.

The holder of this licence is obliged under all circumstances to keep within easy reach a copy of each of the following service books for the use of the wireless station staff on board—the International Telegraph Agreement with the Service Regulations pertaining thereto, the International Wireless Agreement with the Service Regulations pertaining thereto, the Nomenclature Officielle des Bureaux Télégraphiques, the Nomenclature Officielle des Stations Radio-télégraphiques, the Liste Alphabétique des Indicatifs d'Appel, the book of telegraph rates and Parts I. and II. of the Telegraph Service Regulations, the book of telegraph fees issued for Hungarian wireless stations on ships, and also a copy of the Post and Telegraph Instructions. The holder of this licence must also take care that all these books are corrected and kept up to date by the wireless staff in conformity with the additions and corrections periodically issued by the International Telegraph Bureau and in the collection of Postal and Telegraph Regulations.

SEC. 15.—The holder of this licence is fully responsible financially for all claims of every kind raised on any legitimate grounds against the Hungarian Post Office by anybody for the return of fees paid or indemnification in cases arising from the service of the wireless station on board his ship.

The holder of this licence is fully responsible financially for all telegraph fees of every kind payable under international agreements in accordance with telegraph tariffs arising from the telegraph service of the wireless station on his ship.

These fees—at the financial responsibility of the holder of this licence—are collected in cash by the staff of the wireless station on his ship who are bound to keep and render correct accounts and also supply a list of all the wireless messages received, sent or relayed by the station. The Chief Post and Telegraph Administration issues proper forms for making out such accounts and lists with the necessary instructions for dealing with these forms.

The holder of this licence or the manager of the wireless station in his place—in accordance with Rule XL of the International Wireless Service Regulations—must once a month or in any case within eight days of the ship's return to port from every voyage send at the expense of the holder of this licence to the Section III of the Audit Department of the Ministry of Commerce the following papers and documents carefully arranged and packed:—the originals of all wireless messages, all records of messages transmitted, all receipts for delivery of wireless messages received and all documents and accounts in connection therewith.

Prior to this, however, the holder of this licence or the manager of the wireless station in his place must prepare an account of all fees received in connection with the working of the wireless station on board and after deducting the fees due to the holder of this licence or to the wireless station on board he must pay in the remaining balance at the Hungarian Post and Telegraph Office No. 1 duly receipting on the account the sum retained by the station on the ship of the holder of this licence.

The holder of this licence or the manager of the wireless station on board respectively may only communicate with foreign telegraph authorities or with the International Bureau of the Telegraph Association at Bern through the medium of the Hungarian Chief Post and Telegraph Administration.

SEC. 16.—In home ports the wireless station may not transmit telegrams unless specially authorised to do so by the Chief Post and Telegraph Administration.

When visiting foreign parts, any special regulations in force in the country of sojourn must also be respected in addition to the regulations of the International Wireless Agreement and the Service Rules prescribed therein.

It is the duty of the owner (or charterer) to make himself acquainted with these.

SEC. 17.—The Hungarian Chief Post and Telegraph Administration may at any time have the wireless station examined by their inspectors and its service checked.

The owner (or charterer) of the ship undertakes to afford means to the inspectors of the Hungarian Chief Post and Telegraph Administration, as wel as to officers of the Navy, through the mediation of the Hungarian Chief Post and Telegraph Administration to make themselves thoroughly acquainted in every detail with the handling of the wireless apparatus and to acquire the necessary practice therein.

The owner (or charterer) of the ship must not consent to any stipulation on the part of the supplier of the wireless apparatus that the arrangement of the apparatus or any part thereof should be kept secret and not be shown to the inspectors of the Hungarian Post and Telegraph Administration or to the officers of the Navy.

The owner (or charterer) of the ship undertakes to carry the inspectors and naval officers thus appointed for the study of the apparatus and training in its manipulation free of charge in a class of the ship corresponding to their rank, also to find them, free of charge, cabin accommodation and to make it possible for them to pay for their board at cost price.

Two such persons, however, may only travel on the ship on the same voyage.

SEC. 18.—As an acknowledgment of the right reserved to the State and to defray the costs incurred in the regular control of the wireless station on board, the holder of this licence undertakes to pay the sum of twenty (20) crowns to the Post and Telegraph Office No. 1 within the first half of January every year.

Should an inquiry become necessary owing to any alleged neglect or fault on the part of the owner (or charterer) of the ship or one of his employees, and should such inquiry prove that the holder of this licence or his employee is at fault, the holder of this licence would be obliged to refund to the Treasury the whole of the costs arising from such inquiry.

SEC. 19.—The Hungarian Chief Post and Telegraph Administration has the power to mulct the holder of this licence in a penalty not exceeding 100 crowns for any neglect or

fault in the wireless service provided such omission or commission do not form an act of misdemeanour or a crime. If the wireless station on board should not attend to its duties after repeated warnings, or should the service of the station clash with the public interests, the Hungarian Minister of Commerce shall have the power to inflict eventually a higher penalty of from 100 to 1,000 crowns or to make arrangements to have the wireless service of the station performed by a delegate of the Minister specially appointed for the purpose at the expense and responsibility of the shipping undertaking, and to have any apparent shortcomings in the arrangement of the wireless apparatus put right and any required alterations made at the expense of the holder of this licence, or as an alternative the Minister may suspend or cancel the licence for the working of the wireless apparatus.

SEC. 20.—The period during which the present licence will remain in force is ten (10) consecutive years counted from the date of the licence.

Should the holder of this licence not instal the wireless apparatus within a year counted from the date of the present permit, this permit will be cancelled and the holder of the licence will have to return it for cancellation to the Minister.

SEC. 21.—In accordance with the provisions of Section XXI subsection 3 of the Law of 1888 and in conformity with the decree issued by the Minister of Commerce under No. 62574/1913 in the matter of establishing wireless stations on sea-going passenger ships. the whole of the wireless installation with all its accessories (including furniture, fittings), as well as the installation for sending out distress signals, is to be handed over to the Hungarian Post Office in perfect working order free of cost and without any claims at the expiry of the period specified in the present licence.

Should the Hungarian Post not wish to undertake themselves the service of the station thus handed over to them but to leave its further working in the hands of the holder of this licence, the owner (or charterer) of the ship undertakes to make an annual payment of twenty (20) crowns in acknowledgment of the proprietary right over the installation thus acquired by the State over and above the payment specified in section 15 payment of both sums to be made simultaneously.

Should a ship be put out of commission the licence for the maintenance and working of the wireless station thereon becomes null and void and the holder of this licence shall give the Hungarian Chief Post and Telegraph Administration due notice of the fact. Should it be desired to transfer the wireless installation and re-erect it on another ship, this can only be effected under a new licence.

SEC. 22.—The Minister reserves himself the right to take possession temporarily or permanently, on behalf of the State, of the wireless station at any time even before the expiry of the present licence without giving any explanation whatever for taking such a step.

Should the installation be taken over temporarily the holder of this licence undertakes to hand over for use free of charge the whole of the apparatus with all accessories, fittings and stores for working it as well as the office wherein it is housed and the cabins for the accommodation of the operators without any claim for indemnity, also to supply free of charge the power required for working the installation, also to provide free of charge all necessaries (board, medical assistance and servants, etc.) required by the operators. As against all these services all fees collected for wireless messages are to be handed over in this instance also to the holder of this licence.

Under normal conditions six months' previous notice will be given if the installation is to be taken over permanently, but the Hungarian Minister of Commerce reserves himself the right to shorten the period of this notice or to take possession of the station at any time without any notice at all, should public interest call for such a step.

Should the working of the installation be taken over by the State permanently before the expiry of this licence, the Hungarian Post Office will indemnify the holder of this licence for the technical parts of the wireless apparatus by paying him the cost as per invoices or other evidence to be produced by him less ten (10) per cent. for every year during which the installation has been in use. The balance thus remaining will be paid to him by the Post and Telegraph Administration at Budapest.

Beyond this indemnity to be paid to him the holder of the licence shall not be able to sue in any court for any claim for loss of profit or for the payment of any other indemnity under any other pretext whatever.

SEC. 23.—The Minister reserves himself the right to suspend at any time the service of the wireless station for an indefinite period, or permanently, or for messages of a certain kind without having to assign any reason for such an order and without incurring any liability for damages caused by the suspension.

In case of an order being issued for mobilisation in Hungary, and in time of war, the wireless station on board is to be closed down altogether unless the captain receives instructions to the contrary from the Hungarian Chief Post and Telegraph Administration.

The captain will be held personally responsible for the compliance with this direction.

In other respects the holder of this licence will have to carry out all special orders to be issued in times of an eventual mobilisation or war.

SEC. 24.—This licence may only be transferred to another person with the Minister's special consent to be applied for in advance.

SEC. 25.—Should any difference of opinion arise between the State and the holder of this licence as to the correct interpretation of any of the stipulations of the present licence the matter or matters at issue shall not be referred to any Court of Justice but shall be settled by the Minister of Commerce in the usual official way, adopted by the Public Administration.

SEC. 26.—Every copy of the present licence issued officially is subject to a fixed stamp duty amounting to two crowns.

Budapest 191 .

By the Order of the Minister
Chief Director of Posts and Telegraphs

CERTIFICATE.

C For the ship station on board the Hungarian vessel.................

The general administration of Posts and Telegraphs of Hungary attests that the ship station on board the Hungarian vessel ....was installed on the basis of the licence of the Hungarian Government and that the installation of the ship station complies with the conditions prescribed by the service regulations annexed to the International Radiotelegraph Convention.

The ship station is classed in the..........

category from the point of view of its obligations as to hours of service.

Normal range in nautical miles:

Day..................

Night................

Budapest, the..........

General Administration of Posts and Telegraphs of Hungary.

CERTIFICATE.

D The Commission, delegated by the Hungarian Minister of Commerce, has submitted Mr. .... born at...........................on the ....to an examination of the radiotelegraph service and tested his professional ability as regards:

(a) The adjustment of apparatus and knowledge of its working.

(b) The speed of—

Transmission

..........words per minute.

Reception by sound

..........words per minute.

(c) Knowledge of the regulations applicable to the exchange of radiotelegraph communications.

In testimony whereof the Ministry of Commerce of Hungary has, by virtue of Article X. of the International Radiotelegraph Convention, issued this..........Class Certificate to Mr.................... who at the conclusion of the examination took the oath of secrecy of correspondence.

Made at.......................... ..the ....191 .

ICELAND

ICELAND, known to the geographers of the ancient world as "Ultima Thule," lies in the North Atlantic Ocean between 63° 23′ and 66° 33′ north latitude, whilst its longitude extends from 13° 22′ to 24° 35′ W. Its area is estimated as 40,500 square miles, which means that it exceeds Ireland in point of size.

Colonised in the ninth century by vikings from Norway, the inhabitants were converted to Christianity by Irish monks, and in 1000 A.D. that religion was formally acknowledged by the State.

Originally an aristocratic republic, as described in the pages of its illustrious historian, Snorre Sturlason, Iceland acknowledged the sovereignty of the King of Norway in the thirteenth century, and shared the union of the latter country with Denmark in 1388. On the partition of Europe in 1814, Denmark resigned Norway but retained Iceland.

On December 1st, 1918, an Act creating a Federal Constitution for Denmark and Iceland came into force, the two states remaining free and independent under the same sovereign. Its capital city is Reykjavik, with a population of about 13,000.

Iceland employs the metric system of weights and measures, whilst its coinage is the same as that of Denmark.

CONTROL.

The first wireless station erected in Iceland was designed and fitted for reception only, and was put up by the Marconi Company in 1905. It was shut down in 1908. The present installation at Reykjavik was erected by the same company for the Icelandic Government in the course of 1917-18, and was opened for public service on June 17th, 1918. The station at Flatey á Breidafirdi was put up by Icelandic technicians last year.

The State has a monopoly in the erection and working of wireless stations, but private persons or companies may be permitted to do both under a licence from the Telegraph Department.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
The Rt. Hon. Sigurdur Jonsson	Minister of Public Works	Reykjavik
O. Forberg	Director-General of Telegraphs	Reykjavik
Paul Smith	Engineer of Telegraphs	Reykjavik
Frb. Adalsteinsson ..	Superintendent of Wireless Station and School ..	Reykjavik

Amateur Stations.—Three, only one of which is able to transmit.

Wireless Societies.—There are none devoted solely to radiotelegraphy, but the *Technical Society of Iceland* (Secretary, Otto B. Arnar) gives considerable prominence to the subject.

ADMINISTRATION.

The following legislative enactments govern wireless in Iceland :—

A—Act of November 14, 1917.

B—Regulations under the above Act.

ACT OF NOVEMBER 14TH, 1917, CONCERNING THE WORKING OF WIRELESS TELEGRAPH STATIONS IN ICELAND.

A

I.

The State has a monopoly in the erection and working of wireless stations on Icelandic soil and within the territorial waters of Iceland.

II.

Within the territorial waters of Iceland, the wireless stations of foreign ships may only be used in conformity with regulations drawn up by the Ministry of Iceland. The Ministry can prohibit all wireless communication within the territorial waters of Iceland, and take such precautions as may be necessary to ensure the observance of this prohibition.

III.

On board of Icelandic ships which do not belong to the Government, whether they are within or without the territorial waters of Iceland, wireless stations may only be erected and worked with the permission of the Ministry. If the stipulations accompanying this permission as regards the equipment and working of the station are not complied with, the Ministry can withdraw it. Applications for permission to work wireless stations that are in operation when this Act comes into force must be sent to the Ministry not later than eight weeks from the date of this Act. The Ministry will then decide how their future working is to be carried on.

IV.

On Icelandic soil, and within the territorial waters of Iceland, wireless stations, or other means of wireless communication, can only be installed and worked with the consent of the Ministry, and in conformity with the stipulations made by it.

V.

The Regulations contained in the fifteenth paragraph of the Telegraph Act of October 20th, 1905, imposing secrecy upon those engaged in the telegraph service, are equally applicable to wireless operators. Paragraph 16 of the same Act, regarding the same obligation of those engaged in private telegraph service, is also valid as regards wireless telegraph operators on board of ships.

VI.

The violation of this law, or of the Regulations which the Ministry are hereby empowered to make, shall be punished with fines, or with imprisonment for a term not exceeding six months, provided the violation does not involve a more serious punishment. Further, all apparatus illegally installed or worked shall be confiscated. Lawsuits arising from violations of this law, or the corresponding Regulations of the Ministry, shall be tried in public police courts.

B WIRELESS TELEGRAPHY AND TELEPHONY REGULATIONS.

I.

In the present Regulations:

(*a*) *Wireless station* means apparatus or other means of conveying signals to a distant point without any intermediate conductor.

(*b*) *Wireless operator* means a person employed in the operating of all sorts of apparatus for wireless telecommunication.

(*c*) *Ministry* means the Ministry of Iceland.

(*d*) *Wireless apparatus* means apparatus used for transmission and reception of intelligence between distant points, without any intervening conductor.

1.—Erection of Wireless Stations.

II.

On Icelandic soil, or within the territorial waters of Iceland, or on ships registered in Iceland, a wireless station must not be erected or worked without a special permit of the Ministry, who will issue a licence for such station. This licence, or a certified copy of it, must always be kept at the station named therein. If the stipulations contained in this licence are not complied with, it may be withdrawn and the station dismantled.

III.

Application for a licence to erect and work a wireless station must be sent to the Director-General of Telegraphs.

The installation of wireless stations on board ships must comply with the stipulations of Paragraph VII. of the International Regulations on Wireless Telegraphy.

A wireless station must not be opened for correspondence before the Director-General of Telegraphs has declared that the equipment complies with the stipulations contained in the licence.

2.—Installation and Operation of Private Ship Stations.

IV.

The wireless apparatus of a ship station must always be maintained in strict accordance with the stipulations of the licence.

V.

The Director-General of Telegraphs fixes the hours of service for each coast station.

Ship stations are, as regards hours of service, divided into three classes:

1. Stations permanently open.
2. Stations with limited hours of service.
3. Stations with no fixed hours of service.

During navigation a constant aural watch must be kept at stations of the first class. On stations of the second class watch must be kept during the hours of service, and also during the first ten minutes of each hour. At stations belonging to the third class no regular watch need be kept.

VI.

All ship stations must be so equipped as to permit both transmission and reception with 300 and 600 metre wave-lengths; 600 metres is the normal wave-length of all ship stations.

An exception to this rule may be made in the case of small vessels, where it is difficult to produce a wave-length of 600 metres, when permission may be given to use 300 metre wave-lengths for transmission, but every station must be able to receive wave-lengths of 600 metres.

First and second class ship stations must be fitted with an auxiliary transmitting set provided with an independent power supply,



JAPANESE CRUISER "KONGO," FITTED WITH 25 K.W. SET, SHOWING WIRELESS AERIALS.

[To face page 256



able to work for at least six hours continuously. This set must be fixed in as safe a position as possible, and must have a minimum range of eighty miles for first-class stations and fifty miles for second-class stations.

On ships where the main installation is such as to fulfil the conditions laid down for the auxiliary set, the latter is not required.

VII.

Ship stations should be operated by either one or two wireless operators licensed by the Director-General of Telegraphs.

Wireless operators holding certificates issued by foreign administrations may be permitted to operate ship stations, but a separate permit must be obtained for each voyage.

The certificate states :—

(a) That the holder understands the wireless apparatus and how to operate it.

(b) That the holder is able both to transmit and to receive Morse signals at a speed of not less than

(1) Twenty words a minute in the case of first-grade operators, and

(2) Twelve words a minute in the case of second-grade operators.

(c) That the holder possesses an adequate knowledge of the Regulations affecting wireless telegraphy.

Furthermore, the certificate contains the holder's pledge of secrecy, whereby he is subject to the same law as telegraph operators of the telegraph administration, and the same penalties for violation.

Second-grade wireless operators are permitted to operate ship stations which are only for the ship's own use or that of the crew. Furthermore, they are entitled to operate other stations having at least one first-grade operator.

First-class ship stations are bound to be operated by at least two first-grade wireless operators.

Wireless operators' certificates must always be kept in the wireless cabin, where they can be seen by the radio inspectors of the telegraph department.

VIII.

So far as it is possible all ship stations are bound to exchange traffic with other stations, without regard to the wireless telegraph system of the station concerned. The exchange of traffic between ships must be so arranged as to interfere as little as possible with that of the coast stations, which are generally given priority in public correspondence.

As a general rule, the working of every station must be so arranged as to cause the least possible disturbance in the traffic of other stations. All unnecessary transmission of signs or words is strictly forbidden. Experiments and tests are only permitted in so far as they do not interfere with other stations. In such cases as little transmitting energy as possible and none of the ordinary wavelengths should be used.

In an Icelandic port the wireless apparatus of a ship must not be made use of except in case of :—

(a) The ship being in distress.

(b) The ship being in communication with a ship in distress.

(c) The ship being in a port where there is no telegraph or telephone station.

(d) The ship being, from some reason or other, unable to communicate with the shore otherwise than by wireless.

As regards (c) and (d) the permission of the nearest shore station within the ship's range must be obtained.

IX.

Whenever it is considered necessary, the telegraph department arranges an inspection of each ship's station by persons appointed therefor by the Director-General of Telegraphs. All their orders and arrangements relating to the maintenance and operation of the wireless apparatus must be closely followed. Inspectors are required to supply the Director-General with a report of the inspection of each station.

3.—Handling of Radiotelegrams.

X.

All wireless stations, except those intended for a special, limited correspondence (see Paragraph XI.), are required to accept public correspondence.

Messages are divided into three classes :—

1. Government messages.
2. Service messages.
3. Public correspondence.

The handling of these messages on the land lines will be in accordance with the domestic and international regulations governing the telegraph service. The handling of radiotelegrams between wireless stations will be carried out in accordance with Paragraphs XIV.-XV., XIX.-XL., XLV.-XLIX. of the International Wireless Telegraph Regulations.

XI.

Ship stations may be utilised for:—

(*a*) General public correspondence.

(*b*) Limited public correspondence—*e.g.*, light ships, cable ships, etc.

(*c*) Private correspondence (with special ships and fishing companies).

In general public correspondence the following special radiotelegrams may be accepted:—

1. Telegrams with reply prepaid.
2. Telegrams to be collected.
3. Telegrams to be delivered by mail.
4. Telegrams to be delivered by express.
5. Telegrams with certificate of delivery. This certificate is only issued as regards delivery from the wire to the nearest wireless station.
6. Paid service messages.
7. Express telegrams. These are, however, only transmitted as such along the ordinary land lines.

All stations are bound to give precedence to inquiries from ships in distress.

Ship stations have no responsibility as regards the exchange of radiotelegrams.

Ship stations that are open for general public correspondence will, against payment, be supplied with all printed forms, journals, etc., by the telegraph department; these stations are bound to be governed by all instructions of the Director-General of Telegraphs, as regards operation of the apparatus and handling of the traffic.

XII.

The complete charge for a radiotelegram includes:—

1. The wireless charges:—

(*a*) The shore fees (belonging to the shore station).

(*b*) The ship fees (belonging to the ship station).

(*c*) The transit fees (belonging to an intermediate land or ship station that may be required to handle the message).

2. The wire charges.

The shore charges in this country shall be 40 cents a word, and not less than 4 frs. for each message.

The ship fees are fixed by the shipowner with the approval of the Director-General. They must not exceed 40 cents, and the minimum charges must not be more than that for a ten-words message. Service messages *re* wireless traffic, that has only passed between wireless stations, are not free of charge on the land lines. Press telegrams at half rate are not accepted.

XIII.

The entire charge for handling a radiotelegram from sender to addressee is to be charged to the sender. It is not permitted to charge more than stated in the tariff books.

XIV.

Every shipowner is liable for all charges collected on board his ships.

XV.

Each ship station is bound to send, once monthly, all original radiotelegrams, with relative vouchers, to the Director-General of Telegraphs.

XVI.

Reimbursement of charges, and accounts with the Telegraph Department, are to be governed by the Paragraphs XLI. and XLIII. of the International Radiotelegraph Service Regulations.

4.—Experimental and Amateur Stations.

XVII.

Those wishing to erect an experimental or amateur wireless station must send an application for permission therefor to the Director-General of Telegraphs.

The applicant must prove his ability to transmit and receive at not less than ten words a minute in the Continental Morse code, and that he possesses an elementary knowledge of the science of wireless telegraphy. The application must be accompanied by drawings, and an accurate specification of the station to be erected. Such stations will not be permitted to radiate waves of greater length than 200 metres.

In the event of a licence being granted to such stations the licensee must sign a declaration of secrecy.

5.—Other Stipulations.

XVIII.

The stipulations of Paragraph VIII., *re* use of wireless apparatus in ports, are also valid as regards foreign vessels.

XIX.

The Ministry may prohibit all radiotelegraphic communication within the territorial waters of Iceland, by both Icelandic and foreign vessels, and may make the necessary arrangements to enforce this prohibition.

The Ministry can, furthermore, exercise a censorship over all such radiotelegraphic traffic, and stop any radiotelegram that is considered to be harmful to the safety of the State.

XX.

Violations of these regulations are liable to a fine not exceeding 10,000 krónur, or imprisonment for a term not exceeding six months, if the transgression does not involve a more severe punishment. Illegally erected or operated wireless apparatus will be confiscated.

Lawsuits arising from the violation of these Regulations will be tried in public police courts.

XXI.

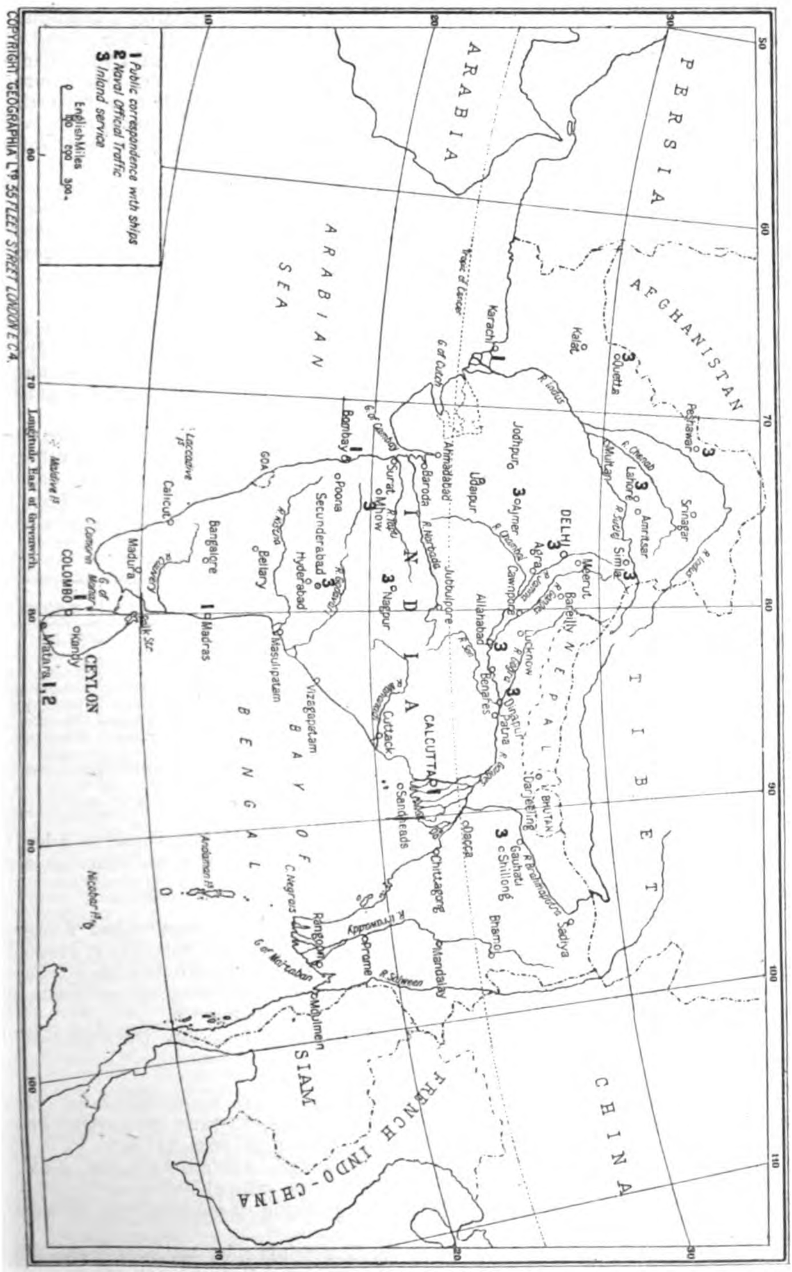
These Regulations shall come into force immediately.

Date of Issue: May 17th, 1918.

INDIA

GREAT BRITAIN'S connection with India followed on that of the Portuguese, Dutch, and French in the fifteenth, sixteenth, and seventeenth centuries respectively. The London East India Company, formed to concentrate in a single corporation the isolated British trading efforts in the Far East, was incorporated under Royal Charter by Queen Elizabeth on December 31st, 1600.

The famous Indian mutiny of 1857 brought a realisation of the fact that a commercial company is not suited for administering an Empire, and in


1 Public correspondence with ships
2 Naval Official Traffic
3 Inland service
English Miles
0 100 200 300
PERSIA
ARABIA
AFGHANISTAN
ARABIAN SEA
TIBET
NEPAL
BHUTAN
INDIA
BAY OF BENGAL
CEYLON
SIAM
CHINA
FRENCH INDO-CHINA
Karachi
Kalat
Quetta
Peshawar
Srinagar
Multan
Lahore
Amritsar
Simla
Jodhpur
Udaipur
Ajmer
DELHI
Agra
Meerut
Bareilly
Cawnpore
Lucknow
Allahabad
Benares
Dinapur
Patna
Darjeeling
Ahmadabad
Baroda
Surat
Mhow
Bombay
Poona
Secunderabad
Hyderabad
Nagpur
Jubbulpore
Cuttack
CALCUTTA
Sandheads
Dacca
Chittagong
Gauhati
Shillong
Sadiya
Bhamo
Mandalay
Prome
Rangoon
Moulmein
Goa
Bellary
Bangalore
Madras
Masulipatam
Vizagapatam
Calicut
Madura
COLOMBO
Kandy
Matara 1,2
Laccadive Is
Maldive Is
Andaman Is
Nicobar Is
C. Comorin
C. Negrais
G. of Martaban
G. of Cutch
G. of Cambay
G. of Manar
Palk Str.
Tropic of Cancer
R. Indus
R. Chenab
R. Sutlej
R. Jumna
R. Ganges
R. Narbada
R. Kistna
R. Godavari
R. Mahanadi
R. Brahmaputra
R. Irrawaddy
R. Salween
Longitude East of Greenwich
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1858 Queen Victoria assumed "the Government of the territories in India." In 1877 the British Queen adopted the title of "Empress of India," and at present the name "British India" covers all territories governed by the King-Emperor through the Viceroy of India, or through any officer subordinate to him; whilst "India" means "British India," together with any territories of any native prince or chief under the suzerainty of His Majesty, exercised through the Governor-General of India or any officer subordinate to him (Act 52 & 53 Vict., C. 63, S. 18).

Continental India (including Baluchistan) stretches between 8° 0′ and 37° 0′ N. latitude, and lies in 61° 0′ to 101° 0′ E. longtitude. Delhi, the new capital, is in 77° 0′ E. longitude. The total area covers 1,803,000 square miles, with a population of over 315,000,000; in other words, it includes a territory larger than the continent of Europe, exclusive of Russia.

CONTROL.

The control of radiotelegraphy in India is vested in theD irector-General of Posts and Telegraphs, assisted by the Chief Engineer of the Telegraphs Department, except as regards small portable sets belonging to the wireless signal squadrons of the Army. All the radio stations in India are erected and worked by the Telegraph Department.

Immediately subordinate to the above-mentioned high officials are the Directors of Telegraph Engineering of the Northern, Eastern, and Southern Circles, as well as the Postmaster-General and the Director of Telegraph Engineering in Burma. There are, in addition, superintendents of telegraph engineering in charge of the telegraph divisions where wireless stations are situated.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
The Hon. G. R. Clarke, O.B.E., I.C.S.	Director-General of Posts and Telegraphs ..	Simla
R. Meredith, Esq., C.I.E. ..	Chief Engineer, Telegraphs	Simla
J. M. Coode, Esq.	Director, Telegraph Engineering Northern Circle	Lahore
W. S. Sharpe, Esq.	Director, Telegraph Engineering, Southern Circle	Bombay
G. P. Roy, Esq., M.I.E.E. ..	Director, Telegraph Engineering Eastern Circle..	Calcutta
G. W. Talbot, Esq.	Postmaster-General and Director, Telegraph Engineering, Burma	Rangoon
C. N. Parker, Esq.	Superintendent, Wireless Telegraphs, attached to the office of the Director-General	Calcutta

The above list does not include the afore-mentioned superintendents of telegraph engineering in charge of divisions where wireless stations are situated.

ORGANISATION.

The first stations opened for traffic in India were three 2-kw. Lodge-Muirhead stations at Diamond Island, Table Island, and Port Blair, erected for the maintenance of communication with the Andaman Islands. These date from March, 1905. There are seventeen wireless telegraph stations in India, all of which are open to general public correspondence.

There are no ***privately owned*** stations, nor are there any ***Wireless Clubs*** or Societies.

ADMINISTRATION.

The administration of radiotelegraphy in India is governed by the Indian Telegraph Act, XIII., of 1885, as modified up to June 1st, 1910. This is further extended by (1) the Indian Telegraph (Amendment) Act, VII., of 1914, by (2) the Indian Post Office and Telegraph (Amendment) Act, XIV., of 1914, and by (3) the Indian Wireless Telegraph (Ships) Rules, 1915.

We also append rules relating to the granting of experimental licences to military officers

At present no licences to work wireless telegraphy are issued, and no experiments by private individuals are permitted.

The following Laws and Regulations affecting radiotelegraphy in India are printed in our pages :—

A—Abstract of the Indian Telegraph Act, No. XIII., of 1885, as modified up to June 1st, 1910.
B—The Indian Telegraph (Amendment) Act, No. VII., of 1914.
C—The Indian Post Office and Telegraph (Amendment) Act, No. XIV., of 1914.
D—The Indian Wireless Telegraph (Ships) Rules, 1915.
E—First Schedule.
F—Second Schedule.
G—Regulations Governing Experimental Licences.

Telegraph Act XII. of 1885.
(Modified up to June 1st, 1910.)

A Part I. deals with former Acts which are hereby repealed, and with definitions of terms used in the present Act.

Part II. reads as follows :—

PART II.

Privileges and Powers of the Government.

4. Within British India, the Governor-General in Council shall have the exclusive privilege of establishing, maintaining and working telegraphs :

Provided that the Governor-General in Council may grant a licence, on such conditions* and in consideration of such payments as he thinks fit, to any person to establish, maintain or work a telegraph within any part of British India.

5. (1) On the occurrence of any public emergency, or in the interest of the public safety, the Governor-General in Council or a Local Government, or any officer specially authorised in this behalf by the Governor-General in Council, may—

(a) take temporary possession of any telegraph established, maintained or worked by any person licensed under this Act ; or

(b) order that any message or class of messages to or from any person or class of persons or relating to any particular subject, brought for transmission by, or transmitted or received by, any telegraph, shall not be transmitted, or shall be intercepted or detained, or shall be disclosed to the Government or an officer thereof mentioned in the order.

(2) If any doubt arises as to the existence of a public emergency, or whether any act done under sub-section (1) was in the interest of the public safety, a certificate signed by a Secretary to the Government of India or to the Local Government shall be conclusive proof on the point.

6. Any railway company, on being required so to do by the Governor-General in Council, shall permit the Government to establish and maintain a telegraph upon any part of the land of the company, and shall give every reasonable facility for working the same.

7. (1) The Governor-General in Council may, from time to time, by notification in the *Gazette* of India, make rules consistent with this Act for the conduct of all or any telegraphs established, maintained or worked by the Government or by persons licensed under this Act.

(2) Rules under this section may provide for all or any of the following, among other matters, that is to say :—

(a) the rates at which, and the other conditions and restriction subject to which, messages shall be transmitted ;

(b) the precautions to be taken for preventing the improper interception or disclosure of messages ;

(c) the period for which, and the conditions subject to which, telegrams and other documents belonging to, or being in the custody of, telegraph officers shall be preserved ; and

(d) the fees to be charged for searching for telegrams or other documents in the custody of any telegraph officer.

(3) When making rules for the conduct of any telegraph established, maintained or worked by any person licensed under this Act, the Governor-General in Council may, by the rules, prescribe fines for any breach of the same :

Provided that the fines so prescribed shall not exceed the following limits, namely :—

(i) when the person licensed under this Act is punishable for the breach, one thousand rupees, and in the case of a continuing breach a further fine of two hundred rupees for every day after the first during the whole or any part of which the breach continues ;

(ii) when a servant of the person so licensed, or any other person, is punishable for the breach, one-fourth of the amounts specified in clause (i).

8. The Governor-General in Council may, at any time, revoke any licence granted under section 4, on the breach of any of the conditions therein contained, or in default of payment of any consideration payable thereunder

9. The Secretary of State for India in Council shall not be responsible for any loss or damage which may occur in consequence of any telegraph officer failing in his duty with respect to the receipt, transmission or delivery of any message ; and no such officer shall be responsible for any such loss or damage unless he causes the same negligently, maliciously or fraudulently.

Part III. deals with power to place telegraph lines and posts, and covers sections 10–18, finishing with *Paragraph* 19.

19. Every telegraph line or post placed before the passing of this Act under, over, along, across, in or upon any property, for the purposes of a telegraph established or maintained by the Government, shall be deemed to have been placed in exercise of the powers conferred by, and after observance of all the requirements of, this Act.

* For rules as to grant of telephone exchanges and telegram subscription rules in connection with such exchanges, see Genl. Stat. R. & O., Vol. II., pp. 972 and 983.

Part IV. deals with penalties under the Act, and contains Paragraphs 20, 21, 22, 23, and 24; passing on to *Paragraph* 25.

25. If any person, intending—

(*a*) to prevent or obstruct the transmission or delivery of any message, or

(*b*) to intercept or to acquaint himself with the contents of any message, or

(*c*) to commit mischief,

damages, removes, tampers with or touches any battery, machinery, telegraph line, post or other thing whatever, being part of or used in or about any telegraph or in the working thereof, he shall be punished with imprisonment for a term which may extend to three years, or with fine, or with both.

Paragraphs 26, 27, 28, and 29 deal with offences connected with controversion of official secrecy and misconduct on the part of officials. This Part IV. concludes with *Paragraphs* 30-32.

30. If any person fraudulently retains or wilfully secretes, makes away with or detains a message which ought to have been delivered to some other person, or, being required by a telegraph officer to deliver up any such message, neglects or refuses to do so, he shall be punished with imprisonment for a term which may extend to two years or with fine, or with both.

31. A telegraph officer shall be deemed a public servant within the meaning of sections 161, 162, 163, 164, and 165 of the Indian Penal Code; * and in the definition of "legal remuneration" contained in the said section 161, the word "Government" shall, for the purposes of this Act, be deemed to include a person licensed under this Act.

32. Whoever attempts to commit any offence punishable under this Act shall be punished with the punishment herein provided for the offence.

Part V. contains supplemental provisions covering charges for damage made against Local Governments and contains Paragraphs 33 and 34 of the Act.

ACT No. VII. of 1914.

Passed by the Governor-General of India in Council.

(*Received the assent of the Governor-General on the 28th February*, 1914.)

An Act further to amend the Indian Telegraph Act, 1885.

Whereas it is expedient further to amend the Indian Telegraph Act 1885; It is hereby enacted as follows:—

1. This Act may be called the Indian Telegraph (Amendment) Act, 1914.

2. For sub-section (2) of section 1 of the Indian Telegraph Act, 1885 (hereinafter called the said Act), the following shall be substituted, namely:—

"(2) It extends to the whole of British India, including the Sonthal Parganas and the Pargana of Spiti, and it applies also to—

(*a*) all native Indian subjects of His Majesty in any place without and beyond British India;

(*b*) all other British subjects within the territories of any Native State in India; and

(*c*) all servants of the King, whether British subjects or not, within the territories of any Native State of India."

3. In clause (1) of section 3 of the said Act for the words "transmitting or making," the words "making, transmitting or receiving" shall be substituted.

4. Section 4 of the said Act shall be renumbered 4 (1) and after the said sub-section the following proviso and sub-section shall be added, namely:—

"Provided further that the Governor-General in Council may, by rules made under this Act and published in the *Gazette* of India, permit, subject to such restrictions and conditions as he thinks fit, the establishment, maintenance and working—

(*a*) of wireless telegraphs on ships within Indian territorial waters, and

(*b*) of telegraphs other than wireless telegraphs within any part of British India.

"(2) The Governor-General in Council may, by notification in the *Gazette* of India, delegate to the telegraph authority all or any of his powers under the first proviso to sub-section (1).

"The exercise by the telegraph authority of any power so delegated shall be subject to such restrictions and conditions as the Governor-General in Council may, by the notification, think fit to impose."

5. After section 19 of the said Act the following sections shall be inserted, namely:—

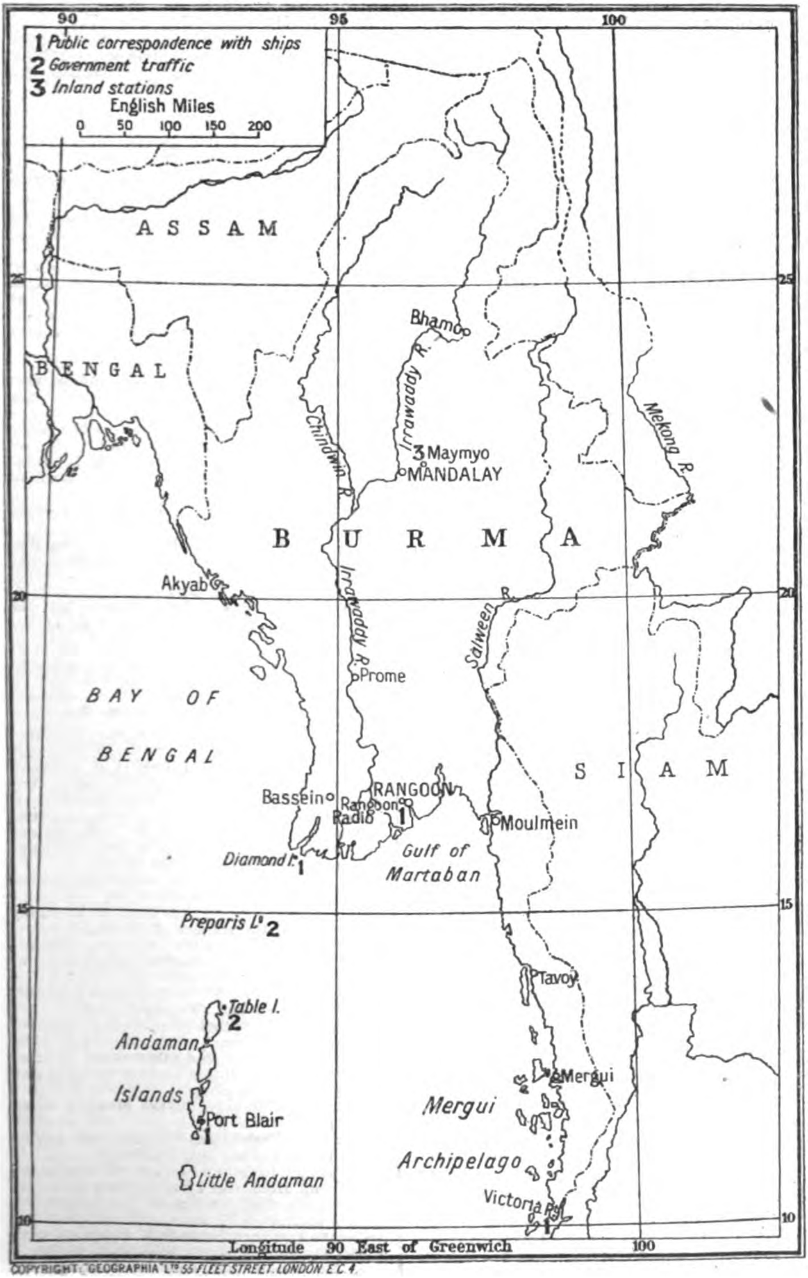
"19A. (1) Any person desiring to deal in the legal exercise of a right with any property in such a manner as is likely to cause damage to a telegraph line or post which has been duly placed in accordance with the provisions of this Act, or to interrupt or interfere with telegraphic communication, shall give not less than one month's notice in writing of the intended exercise of such right to the telegraph authority, or to any telegraph officer whom the telegraph authority may empower in this behalf.

"(2) If any such person without having complied with the provisions of sub-section (1) deals with any property in such a manner as is likely to cause damage to any telegraph line or post, or to interrupt or interfere with telegraphic communication, a Magistrate of the first or second class may, on the application of the telegraph authority, order such person to abstain from dealing with such property in such manner for a period not exceeding one month from the date of his order and forthwith to take such action with regard to such property as may be in the opinion of the Magistrate necessary to remedy or prevent such damage, interruption or interference during such period.

"(3) A person dealing with any property in the manner referred to in sub-section (1) with the *bona fide* intention of averting imminent danger of personal injury to himself or any other human being shall be deemed to have complied with the provisions of the said sub-section if he gives such notice of the intended exercise of the right as is in the circumstances possible, or where no such previous notice can be given without incurring the imminent danger referred to above, if he forthwith gives notice of the actual exercise of such right to the authority or officer specified in the said sub-section.

"19B. The Governor-General in Council may, by notification in the *Gazette* of India, confer upon any licensee under section 4, in respect of the extent of his licence and subject to any conditions and restrictions which the Governor-General in Council may think fit to impose and to the provisions of this Part, all or any of the powers which the telegraph authority possesses under this Part with regard to a telegraph established or main-

* Genl. Acts, Vol. I.


1 Public correspondence with ships
2 Government traffic
3 Inland stations
English Miles
0 50 100 150 200
ASSAM
BENGAL
BURMA
SIAM
BAY OF BENGAL
Bhamo
Irrawaddy R.
Chindwin R.
3 Maymyo
MANDALAY
Mekong R.
Akyab
Salween R.
Prome
Bassein
RANGOON
Rangoon Radio 1
Moulmein
Diamond I. 1
Gulf of Martaban
Preparis I. 2
Tavoy
Table I. 2
Andaman Islands
Port Blair 1
Little Andaman
Mergui
Mergui Archipelago
Victoria Pt. 1
Longitude 90 East of Greenwich
90
95
100
25
20
15
10

tained by the Government or to be so established or maintained:

"Provided that the notice prescribed in section 19A shall always be given to the telegraph authority or officer empowered to receive notice under section 19A (1)."

6. For section 20 of the said Act the following section shall be substituted, namely:—

"20. (1) If any person establishes, maintains or works a telegraph within British India in contravention of the provisions of section 4 or otherwise than as permitted by rules made under that section, he shall be punished, if the tel graph is a wireless telegraph, with imprisonment which may extend to three years, or with fine, or with both, and, in any other case, with a fine which may extend to one thousand rupees.

"(2) Notwithstanding anything contained in the Code of Criminal Procedure, 1898, offences under this section in respect of a wireless telegraph shall, for the purposes of the said Code, be bailable and noncognisable.

"(3) When any person is convicted of an offence punishable under this section, the Court before which he is convicted may direct that the telegraph in respect of which the offence has been committed, or any part of such telegraph, be forfeited to His Majesty."

7. After section 20 of the said Act the following section shall be inserted—namely:

"20A. If the holder of a licence granted under section 4 contravenes any condition contained in his licence, he shall be punished with fine which may extend to one thousand rupees, and with a further fine which may extend to five hundred rupees for every week during which the breach of the condition continues."

8. After section 25 of the said Act the following section shall be inserted—namely:

"25A. If, in any case not provided for by section 25, any person deals with any property and thereby wilfully or negligently damages any telegraph line or post duly placed on such property in accordance with the provisions of this Act, he shall be liable to pay the telegraph authority such expenses (if any) as may be incurred in making good such damage, and shall also, if the telegraphic communication is by reason of the damage so caused interrupted, be punishable with a fine which may extend to one thousand rupees:

"Provided that the provisions of this section shall not apply where such damage or interruption is caused by a person dealing with any property in the legal exercise of a right if he has complied with the provisions of section 19A (1)."

9. After section 29 of the said Act the following section shall be inserted—namely:

"29A. If any person, without due authority,

(*a*) makes or issues any document of a nature reasonably calculated to cause it to be believed that the document has been issued by, or under the authority of, the Director-General of Telegraphs, or

(*b*) makes on any document any mark in imitation of, or similar to, or purporting to be, any stamp or mark of any Telegraph Office under the Director-General of Telegraphs, or a mark of a nature reasonably calculated to cause it to be believed that the document so marked has been issued by, or under the authority of, the Director-General of Telegraphs

he shall be punished with fine which may extend to fifty rupees."

10. In section 34 (1) of the said Act after the figures and word "18, subsection (1)," the words, figures and letter "and section 19A sub-section (2)," shall be inserted.

ACT No. XIV. of 1914.

PASSED BY THE GOVERNOR-GENERAL OF INDIA IN COUNCIL.

(*Received the assent of the Governor-General on 16th September, 1914.*)

C An Act further to amend the Indian Telegraph Act, 1885, and the Indian Post Office Act, 1898.

Whereas in view of the amalgamation of the offices of Director-General of Telegraphs and of Director-General of the Post Office of India, it is expedient further to amend the Indian Telegraph Act, 1885, and the Indian Post Office Act, 1898:

It is hereby enacted as follows:

1. This Act may be called the Indian Post Office and Telegraph (Amendment) Act, 1914.

2. In clause (6) of section 3 and in section 29A of the Indian Telegraph Act, 1885, for the word "Telegraphs," wherever it occurs the words "Posts and Telegraphs" shall be substituted.

3. In section 2 of the Indian Post Office Act, 1898—

(i.) in clause (*a*), for the words "the Post Office of India" the words "Posts and Telegraphs" shall be substituted; and

(ii.) in clause (*k*), after the word "department," the words "established for the purpose of carrying the provisions of the Act into effect and" shall be inserted.

INDIAN WIRELESS TELEGRAPH (SHIPS) RULES, 1915,

DATED DELHI, FEBRUARY 24TH, 1917.

D In exercise of the powers conferred by section 4 of the Indian Telegraph Act, 1885 (XIII of 1885), as amended by the Indian Telegraph (Amendment) Act, 1914, (VII of 1914), the Governor-General in Council is pleased to make the following rules regulating the establishment, maintenance and working of wireless telegraphs on ships within Indian territorial waters:

1. These rules may be called the Indian Wireless Telegraph (Ships) Rules, 1915.

2. In these rules, unless there is anything repugnant in the subject or context—

"Convention" means the International Radiotelegraph Convention concluded at London on July 5th, 1912.

"Director-General" means the Director-General of Posts and Telegraphs, India.

"Harbour" includes harbours whether natural or artificial, estuaries, navigable rivers, piers, jetties, and other works in or at which ships can obtain shelter, or ship and unship goods or passengers.

"Licence" means a licence granted under these rules.

"Service Regulations" means the service regulations annexed to the Convention.

3. Except by general or special permission in writing from the Director-General or an officer authorised by him in this behalf, no person shall work or use a wireless telegraph on board any ship (other than a ship of war) whilst the ship is in any harbour in India.

4. No person shall send any message by

means of the wireless telegraph on board any ship (other than a ship of war), whilst the ship is within Indian territorial waters, when and where such message can be forwarded by a Government telegraph either with or without wires.

5. When communications are made by means of wireless telegraph between any ship within Indian territorial waters and a wireless telegraph station on land, the rules in force for the working of wireless telegraph at that station as given in the Handbook, General Rules, and Departmental Instructions for Radiotelegraph stations, shall be observed.

6. No person shall work the wireless telegraph on board any ship within Indian territorial waters in such a way as to interrupt or interfere with—

(*a*) Naval or military signalling ; or

(*b*) the transmission of messages between other wireless telegraph stations.

Explanation.—In this rule Naval or Military signalling includes signalling or communicating by means of any system of wireless telegraphy, by His Majesty's Imperial, Colonial, or Indian Naval or Military Forces.

7. The Director-General or any officer authorised by him in this behalf may demand to be shown the licence or copy of such licence issued to any ship authorising the use of any wireless telegraph on board the ship or the certificate issued to the operator on the ship, and every person having the licence or certificate in his possession or under his control shall comply with such demand.

8. No wireless telegraph shall be established or worked on any ship registered in British India except under licence granted by the Director-General on behalf of the Governor-General in Council in the form in the First Schedule to these rules and subject to the terms and conditions set forth in that form.

9. The Director-General shall not grant a licence unless he is satisfied that—

(*a*) the wireless telegraph can be worked in accordance with the provisions of the Convention and the Service Regulations, and

(*b*) operators qualified in accordance with Rule 12 will be employed to work the same.

10. A licence may include any number of ships belonging to the same person.

11. (1) The Director-General may grant to the holder of a licence a supplementary licence in respect of any ship belonging to him and not included in the original licence.

(2) A supplementary licence shall be in such form as the Director-General thinks fit, and shall be deemed to be incorporated with the original licence, and the original licence shall apply to each ship included in the supplementary licence to the same extent as if the ship had been included in the original licence.

12. No person shall work a wireless telegraph on board any ship registered in British India unless he is of British nationality and holds either a first or a second-class certificate of competency granted by, or under the authority of, the Director-General or a certificate (issued by the authority empowered to grant such certificates) entitling the holder to be employed as a wireless telegraph operator on board ships registered in the United Kingdom or in a British Possession or Protectorate.

13. (1) The Director-General may grant certificates of competency in accordance with the conditions contained in the Second Schedule to these rules.

(2) Should the holder of certificate of competency granted under these rules be proved to the satisfaction of the Director-General wilfully or negligently to have failed to comply with the provisions of the Convention or the Service Regulations, or any other regulations which may be issued from time to time for his guidance, the Director-General may endorse, suspend or cancel the certificate.

(3) The Director-General or any officer authorised by him in this behalf may require the holder of a certificate of competency to produce the same for endorsement under sub-rule (2), and the holder shall comply with such requisition.

14. Nothing in these rules shall apply to the use of a wireless telegraph for the purpose of making or answering signals of distress.

THE FIRST SCHEDULE.

(*See Rule* 8.)

LICENCE TO ESTABLISH WIRELESS TELEGRAPH SHIP STATIONS.

E In these presents (and in the Table annexed hereto) the following words and expressions shall have the several meanings hereinafter assigned to them unless there be something either in the subject or context repugnant to such construction (that is to say) :

The expression "The Director-General of Posts and Telegraphs" means the Director-General of Posts and Telegraphs, India, for the time being.

The expression "the Telegraph Act" means the Indian Telegraph Act, 1885 (XIII of 1885).

The word "telegraph" has the same meaning as in the Telegraph Act.

The expression "the Rules" means the Rules made from time to time under the Telegraph Act.

The expression "Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy between ships of His Majesty's Navy and Naval Stations or between a ship of His Majesty's Navy or a Naval station and any other wireless telegraph station whether a coast station or a ship station.

The expressions "the International Telegraph Convention" and "the International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated 10th–22nd July, 1875, and the Service Regulations made thereunder and include respectively any modification of the said Convention or Regulations made from time to time.

The expression "the Radiotelegraph Convention, 1912" means the International Radiotelegraph Convention signed at London on the 5th day of July, 1912, and the Service Regulations made thereunder and includes any modification of the Convention or Regulations made from time to time.

The expression "coast station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

The expression "ship station" means a wireless telegraph station established on board a ship which is not permanently moored.

Apparatus shall be deemed to be "syntonised" when the transmitting apparatus is so adjusted as to communicate with a receiver

which has a corresponding adjustment, and to produce as little effect as possible on a receiver not having a corresponding adjustment.

WHEREAS   of
                     hereinafter called "the Licensee" is desirous of establishing, maintaining and working on the ships belonging to the Licensee, specified in the Table annexed hereto, wireless telegraphy under section 4 of the Indian Telegraph Act, 1885 (XIII of 1885);

AND WHEREAS by reason of the provisions of the said Telegraph Act it is unlawful to establish, maintain or work any apparatus for wireless telegraphy on board any ship registered in British India except under and in accordance with rules made in that behalf by the Governor-General of India in Council;

AND WHEREAS the Licensee has requested the Governor-General in Council to grant to the Licensee the licences, powers, and authorities hereinafter expressed and contained for the period, upon the terms and subject to the stipulations and conditions hereinafter appearing;

NOW the Governor-General in Council in exercise of all powers and authorities enabling him in this behalf hereby grants to the Licensee during the term or period commencing on the day of the date hereof, and terminating on the 31st day of December 191 , licence and permission—

(i.) To establish, maintain and work for the purposes hereinafter mentioned at the ship stations specified in the Table annexed hereto and at such other ship stations as may be specified in any Supplemental Licence given from time to time under the hand of the Director-General of Posts and Telegraphs, but subject in all respects to the Rules, apparatus for wireless telegraphy of the kind used in the system known as the system of wireless telegraphy.

Provided that—

(*a*) the apparatus installed at each ship station shall be of the character specified in the said Table opposite to the name of such station or in any such supplemental licence as aforesaid;

(*b*) the apparatus used at all of the said ship stations shall be syntonised;

(*c*) the licensed apparatus shall be so constructed as to be capable of using wave-lengths of 300 and 600 metres in length as measured by the standard of measurement in use for the time being by the Government of India and such other wave-lengths not exceeding 600 metres in length as shall be authorised in writing from time to time by the Director-General of Posts and Telegraphs;

Provided that only wave-lengths of 600 metres shall be used by the Licensee during the period of any war in which the United Kingdom is engaged;

(*d*) the apparatus shall admit of the transmission and reception of messages at the rate of not less than twenty words a minute, five letters being counted as one word;

(ii.) to transmit and receive messages by means of the licensed apparatus between the said ship stations and between the said ship stations and coast stations and other ship stations. Provided that the transmission and receipt of messages from and at the said ship stations when in any harbour in India shall be subject to such conditions and restrictions as the Governor-General in Council may prescribe from time to time; and

(iii.) to receive money or other valuable consideration for or in respect of the use of the licensed apparatus or for or in respect of the transmission or receipt of messages by means of the said apparatus:

And it is hereby declared that the said licence and permission is granted on and subject to the following further conditions and provisions;

1. The licensed apparatus shall not be used by the Licensee or by any other person either on behalf or by permission of the Licensee for the transmission or receipt of messages except messages authorised by this Licence.

2. (1) The Licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus interfere with Naval signalling.

(2) If the Governor-General in Council is of opinion that the working of the licensed apparatus at any ship station specified in the Table annexed hereto or in any such Supplemental Licence as aforesaid is inconsistent with the free use of Naval signalling the Licensee shall, when required in writing by the Director-General of Posts and Telegraphs so to do, close the said station; the making of such a requisition shall be conclusive evidence of the opinion of the Governor-General in Council to the effect aforesaid.

(3) These provisions for the protection of Naval signalling shall be construed to be without prejudice to the generality of any other provisions of this Licence.

3. For the purpose of this Licence the Licensee shall observe the International Telegraph Convention and the International Telegraph Regulations so far as the said Convention and Regulations are capable of being applied to wireless telegraphy in common with ordinary land and submarine telegraphy.

4. The Licensee shall observe the provisions of the Radiotelegraph Convention, 1912.

5. The Licensee shall comply with all such directions and observe all such rules and regulations as may be given or made by the Director-General of Posts and Telegraphs from time to time for the purpose of preventing interference with the working of any other wireless telegraph station and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station.

6. The licensed apparatus shall not, without the consent of the Director-General of Posts and Telegraphs, be altered or modified in respect of any of the particulars mentioned in the Table annexed hereto or in any such Supplemental Licence as aforesaid.

7. The Licensee shall at all times indemnify the Governor-General in Council against all actions, claims and demands which may be brought or made by any corporation, company or person in respect of any injury arising from any act licensed or permitted by these presents.

8. (1) Subject to the provisions of this Licence and of the Rules the Licensee shall transmit messages by means of the licensed apparatus on equal terms without favour or precedence whether as regards rates of charge order of transmission or otherwise.

(2) In respect of the messages transmitted on behalf of His Majesty's Government the Licensee shall charge rates not in excess of half of the rates charged to the ordinary public.

9. The Licensee shall so far as possible receive from ships and light stations all requests for assistance and all signals of distress and shall answer such requests and signals and retransmit them with the least possible delay to the proper authorities by means of the licensed apparatus or any other means in the power of the Licensee.

10. The licensed apparatus at the said ship stations shall be worked only by a person or persons holding a certificate or certificates of competency issued by the Director-General of Posts and Telegraphs or by the proper authority in the United Kingdom, or in any British Possession or Protectorate.

11. The Licensee shall not divulge to any person (other than properly authorised officials of the Government of India or a competent legal tribunal) or make any use whatever of any message coming to the knowledge of the Licensee and transmitted by Naval signalling or by any system of wireless telegraphy provided or maintained by or for the purposes of the different Departments of the Government of India, or by any other Licensee of the Government of India.

12. (1) The Licensee shall keep full accounts, records and registers of all messages transmitted by means of the licensed apparatus, and in such registers each of such messages shall be accompanied by its identifying number and date and full particulars of its place of origin and of ultimate destination and such further particulars as the Director-General of Posts and Telegraphs shall from time to time reasonably require to be shown, messages on the service of the Government of India being in such registers distinguished from other messages.

(2) The Licensee shall preserve all used message forms written and printed and transcripts of messages and all other papers for a period of at least fifteen months counting from the month following that in which the radio-telegrams were handed in as prescribed by the Radiotelegraph Convention, 1912, and in default of any provisions on the subject in the said Convention for such period as is from time to time prescribed by the International Telegraph Regulations and such registers and message papers shall be open to the inspection of the Director-General of Posts and Telegraphs or his officers thereto authorised at the Office of the Licensee in between the hours of 10 a.m. and 5 p.m., on every day except Sunday or a statute or general holiday.

13. The Licensee shall render to the Director General of Posts and Telegraphs such accounts as the Director-General shall from time to time direct in respect of all charges due or payable under the Radiotelegraph Convention, 1912, in respect of messages exchanged between the ship stations hereby licensed and coast stations and shall pay to the Director-General at such times and in such manner as he shall direct all sums which shall be due from the Licensee in accordance with such accounts.

14. The Director-General of Posts and Telegraphs and any agent authorised in that behalf in writing by him may at all reasonable times enter upon all or any of the ship stations mentioned in the said Table for the purpose of inspecting and may inspect any apparatus fixed or being in such stations respectively for the purpose of sending and receiving messages by wireless telegraphy and all other telegraphic instruments and apparatus fixed or being in such stations respectively and the method of working and user of such apparatus and telegraphic instruments, respectively.

15. The Licensee shall carry on every ship mentioned in the said Table on which a ship station is established a print or copy of the licence and supplemental licence if any certified under the hand of an officer authorised for that purpose by the Director-General of Posts and Telegraphs to be a true copy and also such documents as may be prescribed by the Director-General of Posts and Telegraphs for the purpose of enabling the Licensee to communicate with coast stations in accordance with the Radiotelegraph Convention, 1912.

16. Except with the consent in writing of the Governor-General in Council the Licensees shall not assign, underlet or otherwise dispose of, or admit any other person or body to participate in the benefit of the licences, powers and authorities hereby granted or any of such licences, powers or authorities.

17. (1) If and whenever an emergency shall have arisen in which it is expedient for the public service that the Governor-General in Council shall have control over the transmission of messages by the licensed apparatus it shall be lawful for the Director-General or any other officer specially authorised by him to cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of the Governor-General in Council and to be used for the service of the Government and subject thereto for such ordinary services as to the said officer may seem fit and in that event any person authorised by the said officer may enter upon any ship on which any such apparatus is installed and take possession of the said apparatus and use the same as aforesaid.

(2) Any such officer may in such event as aforesaid instead of taking possession of the licensed apparatus as aforesaid direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct and such persons may accordingly enter upon any ship on which any such apparatus is installed and assume such control or the said officer may direct the Licensee to submit to him or any person authorised by him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages, to stop or delay the transmission of any messages, or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said officer may prescribe and the Licensee shall obey and conform to all such directions.

(3) The Licensee shall be entitled to reasonable compensation for any damage to the licensed apparatus arising in consequence of the exercise of the powers conferred by this clause.

18. The Governor-General in Council may at any time by notice in writing but without assigning any reason revoke and determine these presents and the licences, powers and authorities hereinbefore granted and each and every of them as to all or any of the ship stations hereby licensed and thereupon these presents and the said licences, powers and authorities and each and every of them shall absolutely cease, determine and become void as to all or any of the said ship stations (as the case may be) but without prejudice to any right of action or remedy which shall have accrued or shall thereafter accrue to the Government of India under any condition or provision herein contained.

19. Nothing in these presents contained shall prejudice or affect the right of the Governor-General in Council, from time to time, to establish, extend, maintain and work any system or systems of telegraphic communication (whether of a like nature to that hereby licensed or otherwise) in such manner as he shall in his discretion think fit; neither shall anything herein contained prejudice or affect the right of the Governor-General in Council from time to time and at any time to enter into agreements for or to grant licences relative to the working and user of telegraphs (whether of a like nature to those hereby licensed or otherwise) or the transmission of messages in any part of British India or Indian Waters by means of wireless telegraphy or by any other means with or to any person or persons whomsoever upon such terms as he shall in his discretion think fit. And (save as in this Licence expressly provided) nothing herein contained shall be deemed to authorise the Licensee to exercise any of the powers or authorities conferred on or acquired by the Governor-General in Council by or under the Telegraph Act.

20. Any notice, request or consent (whether required to be in writing or not) to be given by or on behalf of the Governor-General in Council under these presents may be under the hand of the Director-General of Posts and Telegraphs and may be served by sending the same in a registered letter addressed to the Licensee at the office for the time being of the Licensee, or if such notice, request or consent relates to any particular ship station, by delivery to the master of the ship upon which such station is installed; and any notice to be given by the Licensee under these presents may be served by sending the same in a registered letter addressed to the Director-General of Posts and Telegraphs.

Signed, sealed and delivered by Director-General of Posts and Telegraphs for and in the name and as the act and deed of the Governor-General in Council in the presence of

Other particulars :—

THE SECOND SCHEDULE.

(*See Rule* 13.)

Conditions for the Granting of Certificates of Competency as Wireless Telegraph Operator on Board Ships, Registered in British India.

1. Certificates of competency as wireless telegraph operator on board ships registered in British India shall be granted by the Director-General subject to an examination, shall be issued in Form B annexed hereto, shall indicate the system or systems of radio-telegraphy in which the holder's examination was conducted, and shall certify that the holder—

(*a*) in the case of first-class certificates, is able to send and receive, by sound, messages in plain language in the International Morse Code at a rate of not less than 20 words per minute (five letters being counted as one word); or

(*b*) in the case of second-class certificates is able to send and receive, by sound, messages in plain language in the International Morse Code at a rate of from 12 to 19 words per minute (five letters being counted as one word); and

(*c*) is able to adjust the apparatus ordinarily used in some well-known system of wireless telegraphy so as to suit the varying conditions of working, without using excessive transmitting power; and

(*d*) has an efficient working knowledge of the regulations applicable to the exchange of radiotelegraphic traffic.

2. (1) Candidates at an examination will be expected—

(*a*) to send on an ordinary Morse Key for five consecutive minutes at not less than the prescribed speed. The accuracy of signalling, the correct formation of the letters, and the correctness of spacing shall be taken into account;

(*b*) to receive and write legibly at the prescribed speed from a double headgear telephone receiver as ordinarily used for radiotelegraphic reception;

(*c*) to understand simple diagrams of the

TABLE OF LICENSED SHIP STATIONS.

Name of Ship on which Station Established	Normal Range of Signalling in Nautical Miles. By Night.	Normal Range of Signalling in Nautical Miles. By Day.	Character of Apparatus. Description of Receiving Apparatus.	Character of Apparatus. Wave Lengths in Metres.	Power. Source and Maximum Output.	Power. Maximum taken by Transmitting Instruments. Current.	Power. Maximum taken by Transmitting Instruments. Voltage.	If Alternator is used Number of Cycles per Second.
1.	2.	3.	4.	5	6.	7	8.	9.

electrical connections of the apparatus used in the system in which he is being examined ;

(*d*) to be able to connect up the apparatus with the help of such diagrams so far as this is required in the system in which he is being examined ;

(*e*) to name the principal parts of the apparatus and indicate their use ;

(*f*) to mention the most common faults, and the means usually taken to remedy them in the system in which he is being examined ;

(*g*) to explain the steps taken to change from one wave-length to another, in sending and receiving, in the system in which he is being examined.

(2) The practical examination shall embrace the following :—

(*a*) Connecting up the apparatus.
(*b*) Operating (sending and receiving).
(*c*) Regulating and adjusting.
(*d*) Altering the wave-length.
(*e*) Reducing or increasing the transmitting power.
(*f*) Tracing and clearing faults.

(3) The examination in regard to the actual transmission of messages shall be based upon the rules contained in the handbook published by the Director-General.

3. Candidates for examination shall fill up an application in Form A annexed hereto and submit the same to the Director-General at Calcutta. The date and place of examination shall be notified to the candidate as soon as possible after receipt of the application.

If the candidate be successful in his examination he will sign the photograph in the presence of the Examining Officer. The Examining Officer will at the same time take the age, place and date of birth and the description of the candidate from the latter's application in Form A.

The photograph will be affixed to the back of the certificate in the office of the Director-General of Posts and Telegraphs and stamped with a special date stamp overlapping photograph and certificate.

The particulars of the description of the candidate as also his age, and date and place of birth will be entered on the back of the certificate.

The certificate will then be sent to the operator by post.

The photograph and description will be checked by the Port Authorities when the operator is signing on a ship. If the operator has not already signed his name in the space provided for that purpose on the front of the certificate he will do so in the presence of the Port authorities.

4. Candidates for examination shall pay an examination fee of Rs. 5 by means of postage stamps affixed to the form of application.

5. Examinations of persons desirous of obtaining certificates of competency referred to in Condition 1 shall ordinarily be conducted at Calcutta. Special arrangements may be made, where circumstances permit, for holding an examination at any wireless station at which suitable apparatus is provided for the purpose.

6. If the candidate satisfactorily passes the examination, he shall make a declaration that he will observe the secrecy of radiotelegrams which come to his knowledge in the course of duty.

7. In case of failure at an examination a candidate shall not ordinarily be re-examined until after the lapse of three months. An additional fee of Rs. 5 shall be payable in respect of the further examination.

REGULATIONS GOVERNING EXPERIMENTAL LICENCES.

G The Government of India have decided that the granting of licences to military officers in respect of wireless telegraph apparatus used for experimental purposes shall be regulated by the following general principles :—

(1) When an officer conducts experiments in wireless telegraphy in his official capacity at the expense of the Government no licence is required, but only executive permission, which may be given, so far as the Telegraph Department is concerned by the Director-General, Posts and Telegraphs.

(2) When an officer carries on experiments as a private individual at his own expense he must obtain a licence. If the approval of the military authorities is required to what he proposes to do, he should obtain such approval before the Director-General, Posts and Telegraphs, is approached. The licence will then be submitted by the Director-General, Posts and Telegraphs, for the sanction of the Government of India.

(3) With reference to the above, attention is drawn to the necessity for applying for licences to own and use wireless telegraphy apparatus or installations, experimental or otherwise. Applications for such licences will be submitted through the Chief of the General Staff and will contain particulars regarding the apparatus, showing (*a*) system it is proposed to employ, (*b*) maximum range of signalling with applicants' own receiving apparatus, (*c*) power (current and voltage), (*d*) source of power.

ITALIAN SOMALILAND

(See Italy.)

ITALY

THE historic kingdom of Italy occupies the central position amongst the three great peninsulas of Southern Europe, and extends from 46° 40′ 12″ to 34° 54′ 54″ north latitude ; its longitude stretching from 18° 30′ 37″ to 6° 33′ 7″ east. The seaboard of the peninsula covers 2,272 miles. The total area amounts to 110,632 square miles.

The present constitution of Italy is an expansion of the " Statuto Fondamentale del Regno," granted March 4th, 1848, by King Charles Albert to his Sardinian subjects. The executive power of the State belongs exclusively to the Sovereign, working through responsible Ministers ; whilst the legis-

lative authority rests conjointly with the King and Parliament, the latter consisting of two Chambers. King Vittorio Emanuele III., born November 11th, 1869, is a direct descendant of the Vittorio Emanuele who was declared King of Italy on March 17th, 1861, by the first Italian Parliament.

The association of Italy with wireless telegraphy has from the start been very close, and the land of his birth has in many different ways recognised what she owes to her distinguished son, Senatore Marconi.

CONTROL.

Wireless telegraph land stations in the Kingdom belong to the Government and are operated by the Ministry of the Navy (Department of Artillery and Armaments), the Ministry of Posts and Telegraphs and the Ministry of War. Each Ministry includes a special department for dealing with wireless telegraphy. According to latest information the following are the statistics at the time of going to press :—

ITALY.

Public service to ships	10
Government traffic only	19
Public restricted service	3
Trans-Continental service	1

ITALIAN SOMALILAND.

Public service to ships	11
Trans-Continental service	1

TRIPOLI.

Restricted public service	4

ADMINISTRATION.

The current Rules and Regulations which we print below (and which cover the Italian Colonies) may be summarised in the following List :—

A—Law of June 30th, 1910, No. 395.
B—Regulations (No. 227) of April, 1912.
C—Law of June 30th, 1912.
D—Decree No. 1587, dated November 12th, 1916.
E—Decree No. 2223, dated November 4th, 1919.

A The following is known as the Law of June 30th, 1910, No. 395 :—

ART. 1.—The establishment and exploitation of the radiotelegraphic and radiotelephonic installations are reserved to the Government, and in general of all those for which, in the State and in the Colonies, on land and on board ship, energy is employed in order to obtain distance effects without the use of conducting wires.

The Government has the right to grant to any person, public or private scientific or training institution, the authority to establish and to exploit installations of such a nature on land and on the passenger and mercantile vessels, for which previous concession must be obtained.

The licence may be revoked upon the recommendation of the consulting Commission when the installations cause interruption of State stations which were in operation prior to the concession, or when they do not comply with the technical conditions established in the licence.

The exploitation of the installations granted can be revoked, suspended, or taken over by the Government in time of war or during peace whenever the Government may deem it necessary and opportune.

The Government has also the right to inspect, through its officials, those stations which are not the property of the State, in order to ascertain whether the stations are operated in accordance with the regulations.

ART. 2.—The Government administrations concerned in these services are the Ministry of Posts and Telegraphs, of War and the Admiralty; and special regulations determine the share of the respective departments in the execution of the present law.

A permanent consultative commission is constituted to give opinions upon international agreements, questions of a scientific nature, and upon doubtful points relating to the said services.

The commission shall also decide every doubtful case which may arise of a technical character regarding the installation and exploitation of the concessions according to Art. 1.

The commission shall be qualified to determine the power of the radiotelegraphic and radiotelephonic apparatus and technical and economic details for their use on vessels engaged in emigration traffic when the said apparatus has been installed by the Government according to Art. 11 of the Royal Decree, March 14th, 1909, No. 130.

Questions concerning indemnity on account of the cancellation of a licence, suspension of exploitation, or redemption as per Art. 1, shall be referred to an arbitration tribunal, which shall decide, without right of appeal. This tribunal shall be composed of three



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members, one nominated by the Government, one by the licensee, the third by the President of the Tribunal in Rome. The Government can leave to the said Commission the selection of its own arbitrator.

Where several licensees are interested parties to a dispute, and they are unable by mutual agreement to nominate an arbitrator, each shall submit the name of an arbitrator, and the choice will be made by drawing lots in the presence of a judge of the Tribunal of Rome.

▶ The composition of the Commission in the present article and the rules of its working have been determined in the regulations.

ART. 3.—Every infringement of Art. 1 of the present law is punishable by a fine up to £It.2,000 and with imprisonment up to one year, which penalties may be imposed separately and together according to the circumstances. It is in the power of the judge to add to the said penalties the confiscation of the apparatus.

▶ During criminal proceedings the Administration can, in virtue of decree by the prefect, and at all times that in the opinion of the prefect would be in the public interest, obtain immediate possession of the installation and provide if necessary for its removal.

Any person will incur the same penalties if he should avail himself of the installation on board commercial or passenger vessel when they are at anchor in the State waters, except in case of danger or other special cases, which will be dealt with in the regulations.

ART. 4.—If any person shall cause damage or deterioration to installations, or in any other manner interrupt, or cause interruption of the service, even temporarily, he will be liable to the penalties laid down in Art. 315 of the Penal Code, except in the case of military interference with military stations for which offence the penalties stated in the military Penal Code will be imposed.

If any person should abuse the use of the distress signal of the vessels in danger, he will be subject to the same penalties.

ART. 5.—The penalties established by the present law are understood to be applicable, without prejudice to greater offences which may take down in Art. 315 of the Penal Code, except in the case of military Penal Code.

B The following regulations (No. 227) were published in April, 1912, for carrying out the Act of June 30th, 1910 (No. 395):—

SECTION 1.

1. The Ministry of Posts and Telegraphs shall have under its control:—

(a) The installation and exploitation of the stations for public service and constituting the interior net-work of the State and of all those opened for international communication.

(b) The verifications, inspection and control of the material and working of the service of all the land installations exploited in virtue of Government licence.

(c) The tariff regulation for communication between all land stations and ship and shore stations, also accounting.

The Ministry of War shall have under his control:—

The installation and working of stations destined exclusively to the military service, including movable field stations for use in the R. Army. In time of war the management of the service (either a part or all the stations destined to the public service) can be taken over by the military administration.

The Admiralty shall have under its control:—

The installation and exploitation of the ship stations of the Royal Navy, private and mercantile; the verifications, inspections and control of the materials and of the working of the service of the installations made for passenger and mercantile traffic.

SECTION 2.

2. *Permanent Consulting Radiotelegraphic Commission.*—The Permanent Consulting Commission is composed of a President not belonging to the Government Administration, two members selected amongst persons of well known ability in electric and radiotelegraphic science, a superior officer of the Royal Navy attached to the General Staff, and a superior officer attached to the office of the Chief of the General Staff of the Royal Navy.

The following are members of the Commission by right:—

(1) The Director of Posts and Telegraphs Higher Institution.

(2) The Director in Chief of the Radiotelegraphic Department of the Posts and Telegraphs.

(3) The Officer-Director of the Radiotelegraphic Department in the Army Office of Rome.

(4) The Superior Officer of the General Staff of the Royal Navy, Chief of the Department of the Submarines, Electric Material and Radiotelegraphic Service at the Admiralty.

Three members, selected amongst the three mentioned Administrations, will act as Secretaries.

3. The President, members and secretaries will be nominated by Royal Decree, proposed by common accord, by the Ministers of the Posts and Telegraphs, Admiralty, and War.

By Ministerial decree extraordinary members, without vote, can be added temporarily, these to be selected from persons of well-known skill, proposed by the President of the Commission.

4. The Commission shall have its office at the Admiralty in Rome. The meetings of the Commission are to be convened by the President at the request of the interested Administrations.

5. The opinion of the Consulting Commission can be asked on the following subjects:—

(a) On the compilations of arrangements and special rules for the technical organisation of the radiotelegraphic and radiotelephonic service of the State, as well as for practical rules for the constitution and exploitation of the installations.

(b) On all questions of a scientific nature, and doubtful cases referring to the radiotelegraphic and radiotelephonic services.

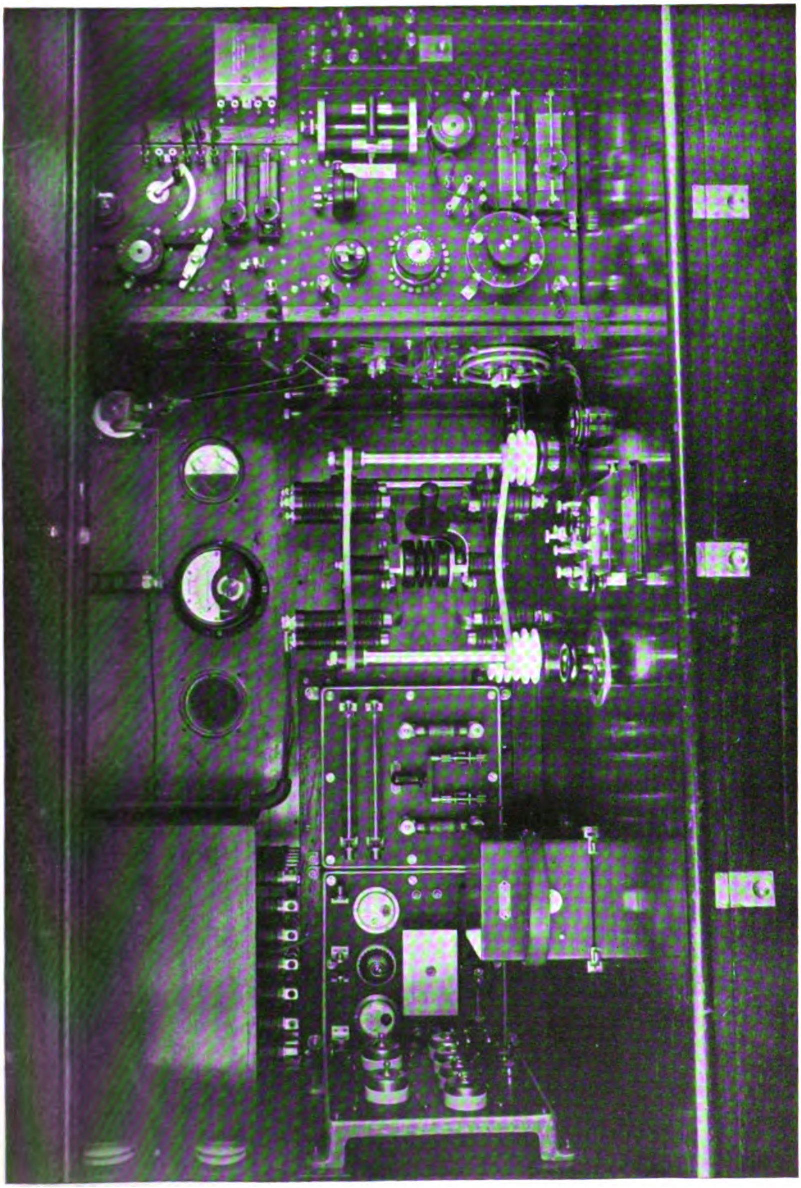
(c) On International Conventions.

(d) On technical conditions with reference to licences of radiotelegraphic and radiotelephonic stations.

(e) The establishment, before granting the licence, of indemnity due in case the installation should be repealed, suspended, or taken over by the State according to paragraph III., Art. 1 of the law.

(f) Repeal of the licences.

(g) On the adoption of new radiotelegraphic and radiotelephonic systems, and on the application of same by the Government service, unless they should deal with interesting systems concerning the defence of the State.



MARCONI TYPE F.2 WIRELESS TELEGRAPH FIELD STATION.

[*To face page* 272

The qualified Administrations may whenever they think it warranted ask the opinion of the Commission on any subject.

The Commission is entitled to avail itself for its own study of the working rooms and of the Government experimental stations, but a previous application must be lodged with the Administrations.

6. The expenses for the working of the Commission are to be divided amongst the three Administrations interested.

SECTION 3.

7. *Licences for the Exploitation of Radiotelegraphy and Radiotelephony.*—Licences to persons, to institutions, and to public and private Administrations for the installation of any radiotelegraphic or radiotelephonic station will be granted in virtue of an agreement containing the conditions to be observed, by a decree issued by the Ministry of the Posts and Telegraphs, acting in harmony with the Ministry of War and the Admiralty.

Such licences cannot last longer than February 16th, 1917. After this period the licence can be renewed.

8. Licences for radiotelegraphic stations for private use are limited to private correspondence between properties of the same licensee, or between properties of two licensees, all correspondence with third persons being absolutely excluded. Such licences are exempted from tax when the stations are constructed on private property and work over all the territory dividing the stations, without interruption by public land.

Licensees are also exempted from taxes which are granted for installation of radiotelegraphic and radiotelephonic stations having for object a scientific or educational purpose.

9. All applications for licences for radiotelegraphic and radiotelephonic installations must contain :—

(*a*) The exact indication of the person or institution making the application and their legal residence.

(*b*) The nature and purpose for the licence, the place or places where it is proposed to instal the station or stations, and their presumed zone of service.

(*c*) The detailed plans for the construction and technical quality of the installation, indicating in a detailed manner the nature and power thereof.

(*d*) The period for which the licence is asked.

(*e*) The period required before starting the station.

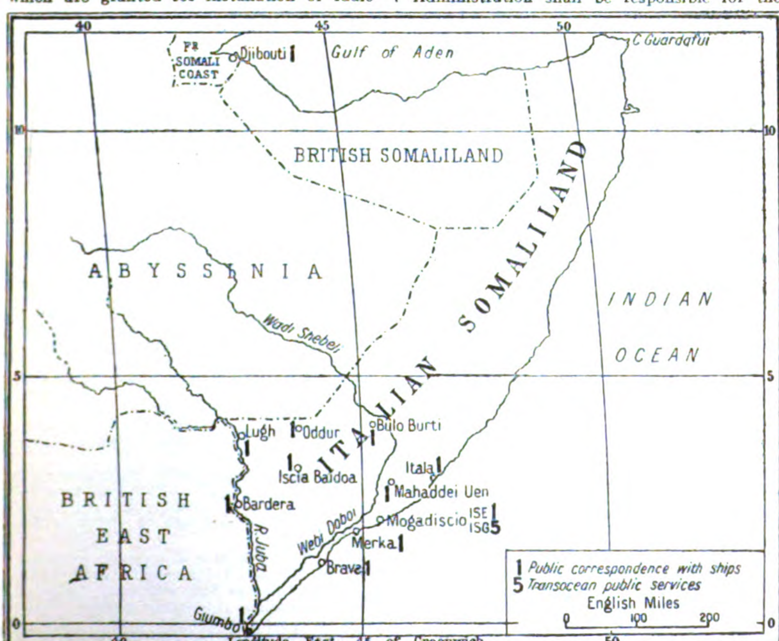
(*f*) The receipt of the amount to constitute the deposit-guarantee, as per Art. 13 and 14. Such a deposit must be paid to the cashier of the local Provincial Director of Posts and Telegraphs by the applicant for the licence.

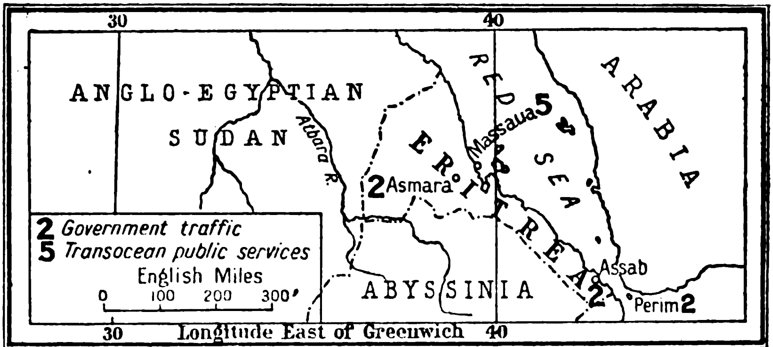
10. Every contract by the licensee, having for object the hire, amalgamation, partial or complete transference of the licence or licences, cannot take place before obtaining in advance the approval of the Government.

11. The licence is considered as expired should the licensee fail to complete and have ready for service the radiotelegraphic or radiotelephonic installation within the time stipulated as per paragraph (*e*) Art. 9.

The licence is considered as expired on the death of the licensee.

12. The officials of the State Telegraphic Administration shall be responsible for the





maintenance of the installation and proper up-keep of the radiotelegraphic and radiotelephonic land stations for which a licence is granted; they shall satisfy themselves that the licensee observes the law and the present regulations and that the licensee fulfils all the obligations imposed upon him by his contract with the Government.

13. Every licensee for a radiotelegraphic or radiotelephonic installation for private use, excepting the cases considered in Art. 8, will pay in advance to the State an annual fixed tax of £It.50.

To guarantee the said tax the licensee must make a deposit as guarantee equal to the amount of fixed tax for one year.

14. Every licensee for radiotelegraphic or radiotelephonic installations for public use will pay every year to the State in quarterly instalments a tax corresponding to 10 per cent. of the revenue from radiotelegraphic or radiotelephonic charges on the basis of the common tariff.

To guarantee the said tax the licensee will make a deposit as guarantee of not less than £It.200. If after one year the guarantee shows to be less than the amount due to the State for one year, then the deposit must be brought to the level of such proportion.

15. The period of the licence and the obligation of the tax established by Articles 13 and 14, begin from the month following the decree granting the licence

16. The deposits as per Arts. 13 and 14 will be forfeited to the public exchequer in case of withdrawal or termination of a licence.

Should the licensee fail to provide for the payment of the taxes due as per Arts. 13 and 14, the Government will apply the deposit, which should be increased in its integral amount within ten days of the said confiscation.

SECTION 4.

17. *Qualifications for the Radiotelegraphic and Radiotelephonic Service.*—The staff necessary for the management and working of the radiotelegraphic and radiotelephonic service is appointed as follows:—

(*a*) For the stations under the control of the Ministry of Posts and Telegraphs, from amongst the officials of specialists of first, second, third and fourth class.

(*b*) For the stations under the control of the Ministry of War, amongst the officers and privates of the engineers of the R. Army.

(*c*) For the stations under the control of the Admiralty, from amongst the officers of the staff and the marines.

Should it at any time be found convenient to the management and working of the above-mentioned stations, a mixed staff selected from the three Administrations can be employed.

The Ministry of the Posts and Telegraphs can for an educational purpose always send its own staff to the radiotelegraphic and radiotelephonic commercial stations by making previous arrangements with the interested Administration.

18. The staff to be employed in the radiotelegraphic stations licensed to private persons must possess a certificate proving their professional ability.

Such a document is granted either by the Ministry of Posts and Telegraphs, or by the Admiralty, according to the service for which it is intended.

SECTION 5.

19. *Limitations to the use of Radiotelegraphic and Radiotelephonic Apparatus.*—Cargo and passenger vessels are prohibited from using their own radiotelegraphic or radiotelephonic stations when they are at anchor in the State waters, except in cases of giving warning of danger or appeals for help, or when they are about to sail, or for urgent reasons within half an hour after their arrival and when the communication with the land is cut off for special reasons or for sanitary measures.

A breach of this rule will render the transgressor liable to the penalties imposed by Art. 3 of the law.

SECTION 6.

20. *Taxes.*—The tax for one radiotelegram is composed:—

(*a*) Of the radiotelegraphic tax due to the coast station;

(*b*) Of the radiotelegraphic tax due to the station on board;

(*c*) Of the telegraphic tax.

For taxation purposes only those radiotelegrams exchanged with Ship stations are considered.

21. All the radiotelegraphic and radiotelephonic stations installed before the promulgation of the law must apply for a licence within one calendar month of the present regulation.

C The following paragraph relating to Wireless Telegraphy is taken from the "Law of June 30th, 1912," which contains regulations concerning marine, commercial and postal services:—

"The undertakers (of said services) are obliged to adopt (on board their ships) . . . .

wireless telegraph and telephone apparatus, whose system and power will be indicated, and, if necessary, modified by the Ministry of the Navy."

D *The OFFICIAL STATUTE BOOK of the Kingdom of Italy contains the following decree, numbered 1587 and dated at Rome November 12th, 1916.*

In pursuance of the law of May 22nd, 1915, No. 671, which confers extraordinary powers on His Majesty's Government and in pursuance of the law of June 30th, 1910, No. 395, and the relative regulations appertaining thereto, approval by Royal Decree of February 1st, 1912, No. 227, and in pursuance of the Royal Decree of July 11th, 1913, No. 1006, which gives effect to the International Radiotelegraphic Convention of London; and the Ministers in Council having given due consideration to the proposals placed before them by the Ministers of Maritime and Railway Transports and of Marine, in concert with the Minister of Posts and Telegraphs;

We have decreed and we hereby decree:—

ART. 1.—All vessels of commerce, whether propelled mechanically or by sails, whether they transport passengers or not, if they have on board a total of fifty persons or more, must, whilst at sea, carry an equipment of radiotelegraphic apparatus.

ART. 2.—From this obligation are exempted vessels on which the number of persons on board is exceptionally and accidentally increased to fifty or more, on account of *force majeure* or because the captain has been obliged to increase the number of his crew to make up for those who are ill, or on account of his having been obliged to transport persons picked up at sea or other persons.

There are also exempted from this obligation:

(1) Vessels which during their voyage do not travel at a distance of more than 150 nautical miles from the nearest coast.

(2) Vessels on which the number of persons present on board is exceptionally or eventually increased to fifty or more, after embarkation, during a part of the voyage, of extra hands which it is found necessary to bring in for the handling of goods; on condition, however, that the aforementioned vessels do not perform trans-oceanic voyages and that, during the above-mentioned part of their voyage, they remain within thirty degrees latitude north and south.

(3) Sailing vessels of primitive construction whose build renders it impossible for them to be equipped with radiotelegraphic apparatus.

ART. 3.—Vessels, which by virtue of Art. 1 above-mentioned are required to be equipped with radiotelegraphic plant, are, as regards the Radiotelegraphic Service, divided in three classes, according to the classification of ship stations (prescribed by Article XIII.*b*) of the regulations annexed to the Radiotelegraphic Convention, signed in London on July 5th, 1912, viz:—

First Class.—Vessels possessing continuous wireless service. In this first-class are included vessels able to carry on board twenty-five passengers or more:—

(i) If they have an average speed of fifteen knots or more.

(ii) If they have an average speed of over thirteen knots, but only on the double condition (*a*) that they have on board 200 persons or more (passengers and crew), and (*b*) that they perform, during their voyage, a journey of over 500 nautical miles between two consecutive ports of call. It is, however, allowable for these vessels to be included in the second-class on condition that the listening-in service be continuous.

Second Class.—Vessels possessing a wireless service limited to certain hours.

In the second class are included vessels able to carry on board twenty-five passengers or more, if they are not, for other reasons, included in the first class.

Vessels of the second class must, whilst at sea, keep a permanent listening-in service of at least seven hours per day, and must, in addition, listen-in for ten minutes at the beginning of each of the remaining hours.

Third Class.—Vessels possessing a wireless service with no fixed hours of working.

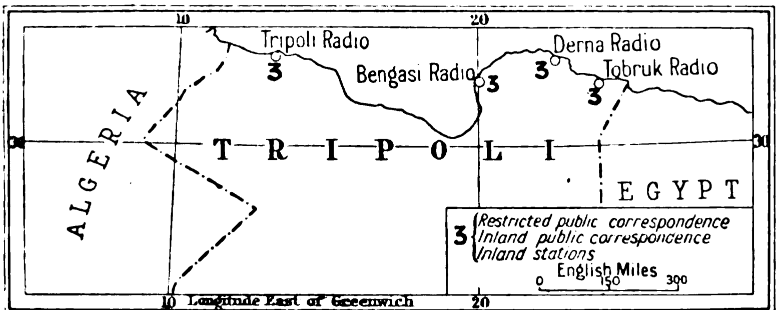
In the third class are included all vessels which are not included in the first or second classes.

The owner of a vessel included in the second or third class has the right to demand that, in the certificate which is issued to him, the vessel in question be allocated to a superior-class, if the said vessel satisfies all the requirements of that class.

ART. 4.—Vessels which, by the terms of Article 1 (above) must be equipped with radiotelegraphic plant shall be required to maintain whilst at sea a continuous listening-in service, if the Government shall judge that it is useful for the safety of life at sea.

In any case a continuous watch is required by:—

1. Vessels which possess an average speed of over thirteen knots; which have on board 200 persons or more; and which perform



during their voyage journeys of over 500 nautical miles between two consecutive ports of call, even when those vessels are classified in the second class.

2. Vessels of the second class, during the whole time when they are voyaging over 500 nautical miles distant from the nearest coast.

3. Other vessels indicated in Article 1 when they are in the trans-Atlantic service; or, whilst in other services, when their itinerary requires them to go over 1,000 nautical miles from the nearest coast.

Vessels used for all kinds of fishing purposes, including whalers which are required to be equipped with radiotelegraphic plant, are not obliged to maintain continuous listening service.

The continuous listening service can be performed by one or more telegraphists holding one of the certificates prescribed in Article X. of the regulations annexed to the International Radiotelegraphic Convention of 1912, and also, if necessary, by one or more qualified listeners. (*ascoltatori patentati*).

Nevertheless, should a reliable automatic alarm apparatus be invented, the continuous listening service may be maintained by means of that apparatus, after its use has been duly authorised by the Ministry of Maritime and Railway Transports.

By the term duly qualified listener (*ascoltatore brevettato*) shall be understood a person holding a certificate of competency issued by an administrative authority established for the purpose. To obtain such a certificate, the applicant shall be required to prove that he is competent to receive and to understand the radiotelegraphic distress signal and safety signal.

The registered owner shall take the necessary steps to provide that secrecy with regard to communications shall be respected by the qualified listeners in his employ.

Art. 5.—The radiotelegraphic apparatus obligatory fitted in accordance with Article 1 must be able to transmit, by day, from vessel to vessel, signals clearly perceptible under normal circumstances and conditions, at a minimum distance of 100 nautical miles.

Every vessel obliged, under the terms of Article 1 above-mentioned, to be equipped with radiotelegraphic apparatus, (in whatever category it may be classed) be fitted in conformity with Article XI. of the regulations annexed to the International Radiotelegraphic Convention of 1912, with an auxiliary radiotelegraphic apparatus, every part of which shall be kept in a location as absolutely secure as possible.

In any case, the auxiliary apparatus must be entirely situated in the upper parts of the vessel, as high up as may be found practicable.

The auxiliary apparatus shall, as provided in Article XI. of the regulations annexed to the International Radiotelegraphic Convention of 1912, possess a source of power devoted to that purpose alone. The apparatus must be capable of being speedily adjusted and employed besides being able to be worked for at least six hours, with a minimum range of eighty nautical miles for vessels of the first class, and of fifty nautical miles for vessels of the other two classes.

If the normal apparatus, the range of which under the terms of this article covers at least 100 nautical miles, satisfies all the conditions indicated above, there is no obligation to carry also an auxiliary apparatus.

Art. 6.—Every installation must, after the owner has sent in his request, and before it starts working, be inspected and approved by the competent authorities; the Certificate of Inspection, which constitutes a working licence in accordance with Article IX. of the regulations annexed to the Raidotelegraphic Convention of 1912, shall contain details of the apparatus as far as they relate to the terms of the concession; it shall be drawn up in duplicate, and one copy thereof shall be handed to the commander of the vessel; but the copy shall not be thus issued if the apparatus does not comply with the conditions laid down in the Radiotelegraphic Convention of 1912 and in the present decree.

Art. 7.—Every captain of a vessel who receives a distress call from a vessel in danger is obliged to go to the help of those in danger.

The captain of every vessel in danger has the right to select from those vessels which have answered his call that vessel or vessels which he considers to be the most capable of affording him help. He should only avail himself of such right after having consulted, as far as possible, the captains of the vessels themselves. The latter are obliged to comply immediately with such request, going with all speed to the help of those in danger.

The captains of the vessels upon whom devolves the duty of rendering assistance are released from their obligations as soon as the captain or captains requisitioned have made known that they are ready to obey the requisition; or as soon as the captain of one of the vessels which has reached the scene of the catastrophe shall have made known to them that their help is no longer necessary.

If the captain of a vessel finds it impossible, or does not consider it reasonable or necessary, under the special circumstances of the case, to go to the help of the vessel in danger, he immediately informs the captain of the latter. He must also enter in his log the full reasons prompting his decision.

Art. 8.—With regard to the terms of Article 1, ship-owners or their representatives shall, within fifteen days of the publication of the present decree, make application to the Ministry of Posts and Telegraphs for any concession required for existing vessels (in accordance with Article 1) not already equipped with radiotelegraphy and not excused from the installation of such apparatus under the provisions of Article 2.

When it is desired to nationalise any vessels after the date of the present decree, and such vessels come within the scope of the conditions laid down in Article 1, neither the necessary nationalisation papers nor any provisional certificate will be issued unless the shipowner shows that he has made the proper application for a licence to instal radiotelegraphic apparatus on board.

Existing licences, notwithstanding the provisions of Article 7 of the regulations regarding radiotelegraphy at present in force, shall remain valid throughout the duration of the war. On their expiry the shipowner shall make application for a renewal in accordance with the article above-mentioned; moreover it is further incumbent upon the shipowner to continue to work the ship station until the new licence has been obtained.

On the official licence there shall be entered a date on which each ship installation must be ready to work, this date will be estimated on the importance of the services for which the vessel is destined, and in accordance with the opinion of the competent authorities.

For vessels which had a radiotelegraphic station, but which did not have the auxiliary apparatus required under the above-mentioned regulations, there is granted a period of one year from the date of the present decree to put the matter in order.

ART. 9.—Vessels whose owners shall not have made application for a radiotelegraphic licence within the period fixed by Article 8; or those whose owners, having obtained their licence, have nevertheless neglected to put the station in working order, either in accord with the above-mentioned provision, or in accord with the term-limit inserted in the licence itself, may be refused the right of working cargoes.

Whenever vessels which have not complied with their obligation to instal radiotelegraphic apparatus are obliged to put to sea either because they have public services to fulfil, or for any reasons of national importance, the Minister of Transports shall have the power to issue official instruction that the station shall be installed and put in working order at the expense of the owner of the vessel.

The same power is granted to the Minister of Transports in cases where the vessels referred to in Article 1 navigate waters outside the limits set forth in Article 2.

The expenses incurred for such official installation of apparatus and for the putting in working order of the same shall be recoverable in the manner indicated in Art. 205 of the laws governing the Mercantile Marine.

TEMPORARY PROVISIONS.

ART. 10.—It is therefore hereby rendered obligatory for the period of the war (and in any case, for not less than three years from the date of the licence) that all mechanically propelled mercantile vessels (of a gross tonnage of 2,000 tons or more in the case of cargo ships and of 1,500 tons or more in the case of passengers vessels) shall instal and maintain radiotelegraph stations in accordance with the existing laws and regulations, even although they are not compelled to apply for a radiotelegraph licence in accordance with Article 1.

ART. 11.—At the discretion of the Minister of Transports and following upon a request of the owners of the vessel, those vessels which perform voyages between ports of the Kingdom, excluding the Colonies, and which do not go beyond twenty miles from the coast, may be relieved of the obligation set forth in the preceding article.

ART. 12.—The regulations contained in Articles 3 and 9 are intended to apply also to those vessels alluded to in these temporary provisions, except as regards the duration of the concession and the obligation to apply for its renewal. However, in the case of these vessels a special auxiliary plant is not indispensable and it will be sufficient if the range of the station do not fall below eighty nautical miles, and that it is possible for regular transmission to be carried out at any moment.

ART. 13.—The Commission for Insurance against war risks at sea, sitting at the "National Insurance Institute," in determining the premiums in respect of vessels, shall take into account the existence on board of radiotelegraph apparatus, whether temporary or permanent, in accordance with these temporary provisions.

ART. 14.—In order to ensure the working of the radiotelegraphic service on mercantile vessels, operators not indispensable for the Royal Army and for the Royal Navy, will be exempted from military service at the request of the Ministry of Maritime and Railway Transports.

ART. 15.—The present decree takes effect from the day of its publication in the *Official Gazette* of the Kingdom of Italy.

We order that the present decree, stamped with the seal of State, be inserted in the official collection of laws and decrees of the Kingdom of Italy, ordering that everyone whom it concerns may observe it or cause it to be observed.

Dated Rome, November 12th, 1916.

Royal Decree No. 2223.

VITTORIO EMANUELE III.

By the grace of God and the will of the Nation, King of Italy.

Having seen the law of 30th June 1910, No. 395, and the relative regulations approved by Royal Decree 1st February 1912, No. 227;

Having seen the Royal Decree No. 1002 of 11th July 1913, ratifying the International Radiotelegraph Convention of London 1912, and the acts thereto annexed;

Having seen the Royal Decree of 28th December 1913, No. 1480, which extends to the radiotelegraph service in the Italian Kingdom the provisions of the above-mentioned Convention of London;

Having recognised the necessity of establishing—in harmony with the provisions of Article X. of the Service Regulations annexed to the aforementioned Convention of London opportune regulations for the issue of Government certificates to radiotelegraphists desirous of performing radiotelegraph service on board mercantile vessels:

On the proposal of the Minister Secretary of State for the Navy, in agreement with the Minister of Posts and Telegraphs;

We have decreed and we decree:

ART. 1.—Certificates of competency to perform radiotelegraph service on board commercial vessels, as contemplated in Article X. of the Service Regulations annexed to the International Radiotelegraph Convention of London, will be issued by the School of Semaphorists and Radiotelegraphists of the Royal Navy at Spezia (Comando difesa militare marittima).

2. At the aforementioned school shall be instituted and maintained up to date a general register of all the candidates examined, with particulars of the examination undergone by each candidate, and the result. The School shall also preserve in its archives a copy of the photograph of each candidate, furnished with all the particulars entered in the general register and also a personal description of the candidate.

The Ministry of Marine shall be empowered to authorise, when circumstances require and merely as an exceptional case, that candidates shall be examined at other branches of the Royal Navy, but the examination must always be conducted under the supervision of the officials of the Royal School of Semaphorists and Radiotelegraphists.

ART. 2.—Candidates shall be examined by a suitable commission composed of:

The Director of the aforementioned School or a superior officer of the Staff of the Royal Navy.

Two officers or officials of the Royal Navy who are specialists in radiotelegraphy.

The commission will assemble in the early days of each month.

ART. 3.—Candidates, in order to be admitted to the examinations, shall forward, in due time,

an application on stamped paper to the value of two lire addressed to the "Direzione della regia scuola semaforisti e radiotelegrafisti Spezia," and such application must be accompanied by the following documents :

Certificate of study (not less than the "licenza elementare").

Authentic copy of birth certificate proving that the applicant has completed his eighteenth year but is not more than thirty years of age ;

"Certificato di penalità" (police certificate of good conduct), the date of which must not be more than two months prior to the date of presentation of such document ;

Certificate of good conduct and personal character issued by the Mayor of the Commune in which the applicant is resident, bearing the visé of the Prefect or Sub-Prefect ;

Any certificates testifying to the applicant's knowledge of radiotelegraphy and foreign languages ;

Certificate of Italian citizenship ;

Certificate of entry in the lists of the military or naval levies and the certificate of service performed ;

Two photographs ;

Postal order for L.2.05, the fee for the certificate of radiotelegraphy. (This amount will be refunded to candidates failing to pass the examination.)

The candidate shall declare in the application whether he has undergone previous examination, and if so the date and place of such examination.

N.B.—A man presenting the certificate of "esito di leva" or the extract of the "matricola della gente di mare" will not be required to present a certificate of Italian citizenship.

All documents shall be presented on paper stamped to the prescribed amount, unless the applicant is able to show, by authentic document, that he is in a state of poverty. The application, however, must always be written on stamped paper.

ART. 4.—Applicants who are admitted to the examinations after having presented the prescribed application duly documented will be notified by the School authorities as to the day on which they are to present themselves to undergo the test.

ART. 5.—The Examining Commission shall rigorously satisfy itself that the candidate fulfils the conditions prescribed in the aforementioned Article X. of the Regulations—namely, that he possesses a perfect knowledge of the radiotelegraph apparatus as shall enable him to render efficient radiotelegraph service on board ship.

Candidates must possess the knowledge of radiotelegraphy stipulated in Appendix A. (programme of examination for the granting of Government radiotelegraph certificates), signed, on Our order, by the Minister of Marine.

ART. 6.—In addition to the above-mentioned tests candidates must undergo practical tests in transmission and oral reception, the duration of such tests to be not less than ten minutes.

In connection with the provisions of Article X. of the Regulations of Service annexed to the International Radiotelegraph Convention of London, shall be issued :

A first-class certificate in radiotelegraphy to those who attain a speed of transmission and oral reception not less than twenty words per minute in a foreign language ;

A second-class certificate in radiotelegraphy to those who attain a speed of transmission and oral reception not less than twelve and not exceeding nineteen words per minute in a foreign language. An average of five characters per word shall be taken as a basis for calculation.

ART. 7.—The aforementioned certificate shall be designated "Brevetto internazionale di radiotelegrafista" and shall bear the photograph of the holder, duly legalised by the stamp of the authority of the Royal Navy, and the personal description of the holder and the qualifications attained.

ART. 8.—Applicants who have been declared by the Examining Commission to be unqualified to receive the International Radiotelegraph Certificate cannot present themselves for further examination if at least six months have not elapsed from the date of the first examination.

ART. 9.—Radiotelegraphists who have obtained a second-class certificate in radiotelegraphy shall only undergo the examination to obtain a first-class certificate after three months have elapsed from the date of the last examination.

ART. 10.—Candidates who have been found unqualified after two consecutive examinations cannot undergo a further test without the special and exceptional authorisation of the Ministry of Marine (Direzione generale di artiglieria ed armamenti).

ART. 11.—The issue of duplicate international certificates in radiotelegraphy is forbidden without the special authorisation of the Ministry of Marine (Direzione generale di artiglieria e armamenti).

ART. 12.—Radiotelegraphists must undertake to maintain the secrecy of correspondence.

ART. 13.—All violations of the secrecy of correspondence, of the International Radiotelegraph Convention and the relative regulations, and of the general rules governing the working of radiotelegraph stations open to public service will be punished by the temporary or permanent withdrawal of the radiotelegraphist's certificate, according to the seriousness of the infraction committed by the radiotelegraphist, irrespective of any more severe punishment that may be imposed.

ART. 14.—The present decree will enter into force from the day of its publication in the *Gazzetta officiale*.

We order that the present decree, to which has been affixed the seal of State, be inserted in the official collection of laws and decrees of the Kingdom of Italy, and we enjoin its observance upon all those whom it may concern.

Given this day, November 4, 1919, at San Rossore.

VITTORIO EMANUELE,
Sechi-Chimienti.

Seen, The Keeper of the Seals :
Mortara.

APPENDIX A.

PROGRAMME OF EXAMINATIONS FOR THE GRANTING OF GOVERNMENT CERTIFICATES IN RADIOTELEGRAPHY.

Diagram of the various radiotelegraph apparatus used and the working of the individual parts.

A perfect knowledge of such apparatus, its adjustment and method of removing faults.

Tuning of a station. Rules relative thereto. Cimoscopi (?)

Receiving apparatus and the mode of using them.

Sources of energy which feed radiotelegraph apparatus : Dynamos, alternators, trans-

formers, converter groups and converters. Accumulators and their maintenance.

Measures necessary in the practice (working) of radiotelegraphy. Voltmetres, ammeter, methods of insulation.

Antennæ and earth.

Precautions to avoid damage to the material and staff during transmission.

Protection devices of the oscillatory circuits.

Perfect knowledge of the general working rules of radiotelegraph stations open to public service, and also of the International Radiotelegraph Convention and the Service Regulations annexed thereto.

Perfect knowledge of the conventional abbreviations.

Knowledge of foreign languages (optional).

Duties of the radiotelegraphist as regards the radiotelegraph service.

Secrecy of correspondence.

Rome, 4th November 1919.

Seen, by order of His Majesty the King:
SECHI,
Minister of Marine.

JAMAICA

THIS "Land of Wood and Water" is the largest of the British West Indian Islands, covering an area of 4,450 square miles, and situated about 90 miles south of Cuba, between latitude 17° 43′ and 18° 32′ N.; its longitude stretching from 76° 11′ to 78° 21′ W. It was discovered on May 3rd, 1494, by Columbus, and named after St. James. The Governor is assisted by a Privy Council and a Legislative Council, the latter consisting partly of nominated and partly of elected members. There are three wireless stations for public correspondence with ships.

ADMINISTRATION.

The laws and Regulations under which radiotelegraphy is administered comprise the following :—

A—Telegraph Control Law, 1904.
B—Direct West India Cable Company's Law, 1909.
C—Regulations under Law of 1904.
D—Further Rules and Regulations.
E—Regulations under the Defence of the Island Law.

THE TELEGRAPH CONTROL LAW (7) OF 1904.

A 1. No person shall, within the Colony or any of its Dependencies, establish, maintain or use any telegraphic apparatus, mechanism, or contrivance, of what nature or kind soever the same may be, without due permission or licence under the hand of the Governor previously obtained for that purpose.

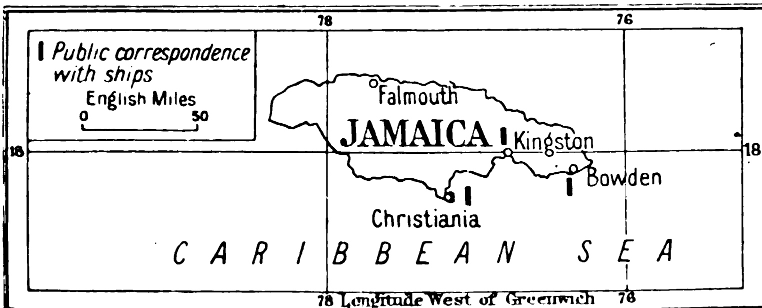
It is hereby expressly declared that what is commonly known as "wireless telegraphy," including the Marconi apparatus and any similar or other mechanism or contrivance whatsoever for the transmission of telegraphic messages without the employment of wires or cables, is a telegraphic apparatus, mechanism or contrivance within the meaning of this Section.

2. It shall be lawful for the Governor in Privy Council from time to time to make and as he shall see fit repeal, alter or vary rules and regulations for all or any of the following purposes, viz:.—

Permitting or licensing any person to establish, maintain, or use any telegraphic apparatus, mechanism, or contrivance, whether for the service of the public or for any private purpose;

Attaching conditions, restrictions, and limitations to the exercise of the privilege by such permission or licence conferred:

Providing suitable penalties and forfeitures for the contravention of the prohibition above contained in Section 1 of this law, and to the breach of any rule or regulation made thereunder, and providing for the recovery thereof, summarily or otherwise; provided that the penalty (over and above forfeitures) to be imposed for any one offence shall in no case exceed a fine of Two Hundred Pounds, or in



default of payment thereof imprisonment, with or without hard labour, for a period not exceeding twelve months;

The exercise of all such powers and control over telegraphic establishments (by temporarily entering into possession thereof or otherwise) as may be necessary for the public safety, whether at all times, or in any case of emergency which may arise.

And generally for the better carrying out of the purposes of this law.

Such rules and regulations shall come into force as from the date of publication thereof in the *Jamaica Gazette*.

3. Nothing in this law contained shall invalidate or impair any legal right already possessed by any telegraph or cable company, relative to the laying down or landing of any telegraphic cable, the removal, renewal, maintenance, and use thereof, or any other like matter.

4. Law 1 of 1903 is hereby repealed.

LAW 21 OF 1909.

The Direct West India Cable Company's Law, 1909.

B Whereas the Direct West India Cable Company, Limited, is desirous of establishing a wireless installation for communication between ships and the shore in Jamaica;

And whereas under the provisions of Law 7 of 1904, entitled "The Telegraph Control Law, 1904," no person shall establish, maintain or use within the Island of Jamaica, or any of its Dependencies, any apparatus or machine whereby communication by wireless telegraphy can be held between the said Island and ships; without having first obtained the sanction of and a licence from the Governor;

And whereas a licence to erect such a wireless station has been granted to the Direct West India Cable Company, Limited, by the Governor of Jamaica

Be it enacted by the Governor and Legislative Council in Jamaica as follows:—

1. The protection, rights, powers, and facilities already granted to the Direct West India Cable Company, Limited, under Law 16 of 1898, entitled "The Direct West India Cable Company's Law, 1898," are granted and extended for the purposes of wireless telegraphy installation to be installed by the company or worked and maintained by them in so far as they may be applicable to the satisfactory and efficient working and maintenance of a wireless station or stations.

2. The Government of Jamaica shall acquire for the use and at the expense of the company a piece of land of sufficient dimensions at a place to be selected by the company and approved by the Government suitable and convenient for the economical erection, maintenance, and working of the installation, and when acquired such piece of land shall be conveyed to the company in fee simple, or if the Government of Jamaica possesses a piece of land of sufficient dimensions at a place approved by the company suitable and convenient for the economical erection, maintenance, and working of the installation and which the Government considers it desirable the company should have, the Government may sell the said piece of land at a price to be mutually agreed upon, or the Government may rent it to the company on such terms as may be agreed on during the period of the licence or for so long as the company may continue to work a wireless station or stations.

The acquisition of land by the Government of Jamaica under this section shall be deemed as an acquisition for public works within the meaning of the Public Lands Acquisition Law, 1897 (Law 31 of 1897).

REGULATIONS.

It will be noted that under Clause 2 of the Telegraph Control Law (7), 1904, the Governor in Privy Council has the power of making rules and regulations, and a set of rules were accordingly promulgated during the year 1909, under which the working of wireless telegraphy is now being administered in Jamaica. These rules read as follows:—

C 1. Any licence granted under Law 7 of 1904 shall only entitle the licensee to establish, maintain and use that particular class of telegraphic apparatus, mechanism, or contrivance mentioned in the licence. Every licence granted under the said law shall make mention of and fully describe the particular class of telegraphic apparatus, mechanism or contrivance which the applicant proposes to establish, maintain and use.

2. Every person establishing, maintaining or using any telegraphic apparatus, mechanism or contrivance in contravention of Section 1 of the Telegraph Control Law, 1904 (Law 7 of 1904), shall be liable to penalty not exceeding two hundred pounds, or, in default of payment to be imprisoned with or without hard labour for a period not exceeding twelve months, and the telegraphic apparatus, mechanism or contrivance so established, maintained or used shall be liable to be forfeited to the Government of Jamaica.

3. Every person licensed under this law, who uses any telegraphic apparatus, mechanism or contrivance, for which he has not a licence shall be liable to the penalty and forfeiture mentioned in Rule 2 hereof, if the Resident Magistrate thinks fit to order such forfeiture.

4. Every person licensed under this law who acts contrary to the terms of this licence shall be liable to the penalty and forfeiture mentioned in Rule 2 hereof, if the Resident Magistrate thinks fit to order such forfeiture.

5. Proceedings for penalty and forfeiture under these rules shall not be taken except upon the authority of the Attorney-General.

6. Proceedings for the recovery of any penalty and for any forfeiture under these rules shall be of a summary nature and shall be taken before the Resident Magistrate for Kingston.

Further Rules.

D *Further Rules and Regulations made by the Acting Governor in Privy Council under the Telegraph Control Law, 1904, Law 7 of 1904.*

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of this colony shall be worked in such a way as not to interfere with (*a*) naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in the colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the colony except with the special or general permission in writing of the Governor.

3. These rules and regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

4. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy the use of the wireless telegraphy on board merchant ships whilst in the territorial waters shall be subject to such further rules and regulations as may be made by the Governor from time to time, and such rules and regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

5. The master of any merchant ship on board of which apparatus for wireless telegraphy shall be worked or used contrary to these rules and regulations shall on summary conviction before a Resident Magistrate be liable to a penalty not exceeding two hundred pounds, and in default of payment to be imprisoned with or without hard labour for a period not exceeding twelve months.

Regulation under the Defence of the Island law.

E Whereas by the powers conferred by Law 9 of 1915, the Defence of the Island Law, 1915, the Governor in Privy Council on the 7th day of August, 1917, made certain Regulations called the Defence of the Island (Consolidation) Regulations, 1917:

And whereas the said Regulations have been amended from time to time by the Governor in Privy Council:

And whereas it is expedient further to amend the said Regulations in manner hereinafter appearing:—

Now, Therefore, the Governor by and with the advice of Privy Council doth order and it is hereby ordered as follows:—

After Regulation 43 the following Regulation shall be inserted:—

43A. (1) Every British sea-going ship of sixteen hundred tons gross tonnage or upwards in respect of which a licence to instal wireless telegraph apparatus has been granted by the Governor in Privy Council shall be provided with a wireless telegraph installation, and shall maintain a wireless telegraph service, and shall be provided with two certified operators, together with suitable accommodation for the apparatus and operators.

(2) Application to the Governor in a form prescribed by him for such a licence shall, unless a licence has before the making of this regulation been granted in respect of the ship, be made on or before the 1st day of May, 1918, by the owner of every such ship which is registered in Jamaica.

(3) The Governor shall, as and when wireless telegraph apparatus and the services of operators become available for the purpose, cause licences to be issued in respect of such ships as in the opinion of the Governor should in the national interests be fitted with such apparatus, and the licences shall specify the date as from which the carrying of such apparatus, under this regulation is to be compulsory, the character of the apparatus, and the qualifications of the operators.

(4) The Governor may:—

(a) Extend the time mentioned in the licence as the time within which any apparatus is to be provided: and

(b) exempt any ship from the obligations imposed by this regulation.

(5) If the provisions of this regulation or the terms of any licence granted thereunder are not complied with in the case of any ship, the master or owner of the ship shall be guilty of a summary offence against these regulations, and if any master fails to make an application in accordance with this regulation he shall be guilty of a summary offence against these Regulations, and in either case if the ship is at any time subsequently found at a port or of within the territorial waters adjoining Jamaica the ship may be seized and detained.

(6) In this Regulation expressions have the same meaning as in the Merchant Shipping Acts, 1894 to 1914.

Made by the Govenror in Privy Council this 9th day of April, 1918.

D. H. Hall,
Clerk, Privy Council.

JAPAN

THE total area of Japan is 24,794.36 square *ri* (the Japanese *ri* is about 2.5 English square miles). This is exclusive of Korea, Formosa, and Sakhalin, the sum of whose area amounts to 18,664·02 square *ri*. The realm ruled by the Emperor Yoshihito lies geographically between 21° 45′ and 50° 56′ north latitude, and between 119° 18′ and 156° 32′ east longitude.

CONTROL.

The Department of Communications controls all Government stations, and inspects all private stations in Japan. These are divided as follows:—

Public service to ships	10
Government traffic only	4
Public restricted service	1
Public transocean traffic	1
Private traffic	1

Besides these stations, the Korean Government has five Government stations, but they are not yet opened for public communication. The Formosan Government has one land station, and the Government General of Kwantung possesses three Government stations, all open for public communication. In addition, there are many Navy and Army stations under the control of the Navy and Army Departments.

Wireless work in the Department of Communications is divided into two sections: (*a*) The Research Laboratory, and (*b*) the Installation and Inspecting Section.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Mr. Nardkichi Yoneda	Director-General of Posts and Telegraphs	Tokio
Mr. Utaro Noda ...	Minister of Communications ..	Tokio
Mr. Toyosuke Hada ..	Vice-Minister of Communications	Tokio

Wireless Research Laboratory.

Official.	*Title.*	*Address.*
Dr. W. Torikata ..	Chief of Wireless Research Laboratory	No. 2801, Sanno, Omori, near Tokyo
Mr. E. Yokoyama ..	Wireless Engineer	No. 2, Uenosakuragicho, Shitayaku, Tokyo
Mr. K. Kitamura ..	Assistant Wireless Engin er ..	Hiraiso, Ibarakiken
Baron T. Kikuchi ..	Assistant Wireless Engineer ..	No. 124, Takebayacho, Kioshikawa, Tokyo
Mr. N. Marumo ..	Assistant Wireless Engineer ..	No. 20, Aoyama Kitamachi 7, near Tokyo
Mr. E. Tsumori ..	Assistant Wireless Engineer ..	No. 151, Shirokaneimazatocho, Shitayaku, Tokyo
Mr. Y. Nozuki ..	Assistant Wireless Engineer ..	Isohama, Ibarakiken

Wireless Installation and Inspecting Section.

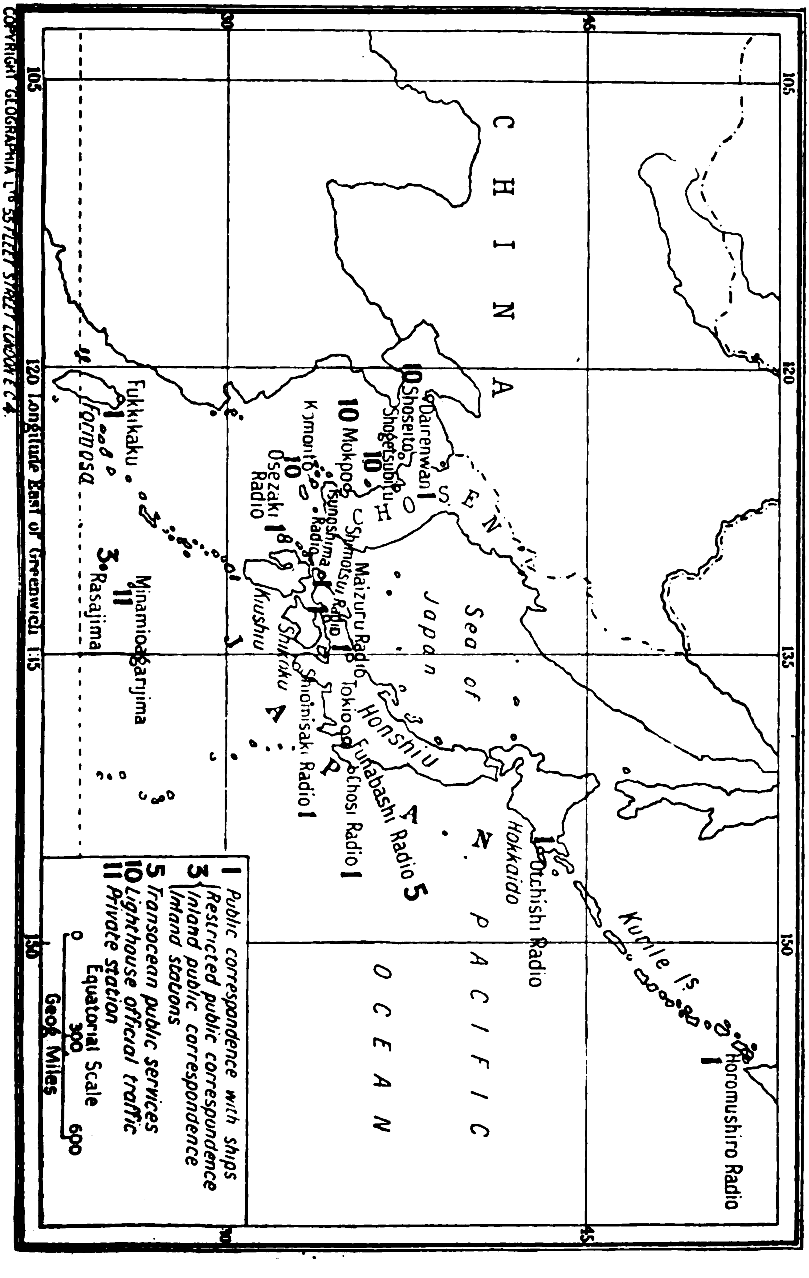
Official.	*Title.*	*Address.*
Mr. M. Saeki	Chief of Wireless Installation and Inspection Section	No. 23, Kasumicho, Azabuku Tokyo
Mr. T. Nakagami ..	Wireless Engineer	No. 82, Kikuzaka, Hongo, Tokyo
Mr. Y. Yoshida ..	Assistant Wireless Engineer ..	No. 30, Nagasaka, Azakuku, Tokyo
Mr. N. Wakamatsu ..	Assistant Wireless Engineer ..	No. 21, Shirokanedaimachi, 2 Shibaku, Tokyo
Mr. U. Koyama ..	Assistant Wireless Engineer ..	No. 324, Shirokanesankocho, Shibaku, Toyko

ORGANISATION.

The first wireless experiment in Japan was carried on, in 1896, according to the conduction method, and electric-wave telegraphy has formed a subject of Japanese research since 1897, its practical utility being first sufficiently proved by the experience of the Japanese Navy in the Russo-Japanese War. The first commercial wireless station was erected in May, 1908, at Choshi, about 80 miles east of Tokyo. Since that time the number of stations have been largely increased. Meteorological information and time reports are conducted by the Chosi and Funabashi stations.

There are two leading companies manufacturing wireless apparatus in Japan—the Annaka Wireless Works and Nippon Radio Works. Of these, the Annaka Works has the larger output, and has manufactured nearly 80 per cent. of Japanese wireless apparatus now in use.

At the Tokyo Naval Arsenal Research Laboratory steady progress has been made in scientific research. In 1919 wireless telephony was installed on war vessels, thereby assuming great importance from a military standpoint. The feature of this invention is its simplicity compared with others of the kind. Commander Hattort, Engineer Hayashi and Engineer Matsuda, who took a leading part towards the perfection of this invention, have been honoured with decorations in recognition of their distinguished service. Thanks to the strenuous efforts of the Laboratory, the study on


CHINA
CHOSEN
JAPAN
Sea of Japan
PACIFIC OCEAN
Hokkaido
Honshiu
Shikoku
Kiushiu
Formosa
Kurile Is.
Horomushiro Radio 1
Otchishi Radio 1
Funabashi Radio 5
Chosi Radio 1
Tokio
Shiomisaki Radio 1
Maizuru Radio 1
Shimotsu Radio
Tsunoshima Radio
Darenwan 1
Shoseito 10
Shogetsubitu 10
Mokpo 10
Komonito
Osezaki Radio 10
Fukkikaku 1
Rasajima 3
Minamioagarijima 11
1 Public correspondence with ships
3 Restricted public correspondence
Inland public correspondence
Inland stations
5 Transocean public services
10 Lighthouse official traffic
11 Private station
Equatorial Scale
0 300 600
Geog. Miles
105 120 135 150
30 45
Longitude East of Greenwich 1:15
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frequency changers was also crowned with success. In consequence of the progress in the world, originality and other features are shown in the manufacture of vacuum tubes in Japan.

A large wireless station is now in process of construction in Formosa by the Japanese Navy with materials produced in Japan, and will shortly be completed. It will be open for service early in spring, 1920.

The Fukushima Wireless Station now under construction is expected to be completed in September, 1920, and will have cost 900,000 yen. The new station will mainly be used for communications in the Pacific in general and with the United States in particular.

In order to promote interest in wireless telegraphy in Japan and also the friendship of those interested, the first social gathering was held at the Seiyoken Hotel, Tokyo, in 1919, under the auspices of Mr. A. Kajima of the Nippon Radio Apparatus Manufacturing Company, and others.

In recognition of the satisfactory result of the study on wireless telephony in the Navy, Messrs. Fusakichi, Hayashi and Oishi each received a medal for his services.

A monthly magazine named *Musen-no-Nippon*, or *Wireless Press*, has been started by Mr. Akira Kajima, of the Nippon Radio Company, and is the only magazine of its kind in Japan.

ADMINISTRATION.

The first wireless regulations in Japan were promulgated in April 1908, under the Telegraph Law of 1900. A number of additions and modifications have since been made of these regulations, and these are now incorporated in the Wireless Telegraph Law, which was promulgated and took effect in 1915. The texts of these laws and regulations now in force are shown in the following pages in accordance with the list below:—

A—Wireless Telegraph Law No. 26.
B—Wireless Telegraph Regulations No. 16 (Japanese reference No. 41-48).
C—Foreign Wireless Telegraph Regulations.
D—Regulations relating to Private Wireless Telegraphs.
E—Regulations relating to Qualifying Examinations for Operators of Private Wireless Telegraphs.

WIRELESS TELEGRAPH LAW.
(Law No. 26, June 19th, 1915.)

A ART. 1.—All wireless telegraphs and telephones shall be under the control of the Government.

ART. 2.—Wireless telegraphs and telephones referred to below may be privately established with the permission of the responsible Minister, to be determined by an Order.

(i.) Installations on board vessels with the object of assuring safety to navigation.

(ii.) Installations on board vessels for communication between vessels engaged in a specific business belonging to one person, with the object of facilitating such business.

(iii.) Installations on board vessels or on land for the exclusive use of private persons and communicating with telegraph offices for the dispatch and receipt of telegrams, but disconnected from public telegraph, telephone, wireless telegraph or wireless telephone communications.

(iv.) Installations on board vessels or on land with the object of facilitating a specific business belonging to one person by mutual communication on land or between land and vessel, disconnected from public telegraph, telephone, wireless telegraph of wireless telephone communications, but to which the preceding clause is not applicable.

(v.) Installations with the exclusive object of carrying out experiments in connection with wireless telegraphy or telephony.

(vi.) Installations recognised as necessary by the responsible Minister, but not coming within the purview of the preceding clauses.

ART. 3.—Restrictions relating to private wireless telegraph and telephone apparatus, their installation and employment, together with the qualifications of persons operating private wireless telegraphs, will be determined by an Order.

ART. 4.—Private wireless telegraphs and telephones must not be used for purposes other than those for which they were established. Provided that their use shall not be prevented for signals of distress at sea, meteorological reports, time signals and in other cases, to be determined by an Order, where public utility is recognised by the responsible Minister.

ART. 5.—Wireless telegraphs and telephones installed on foreign ships may only be used in accordance with the provisions of Article 2. Provided that their use shall not be prevented for Signals of Distress at sea and for communications with telegraph and telephone offices whilst on voyage.

ART. 6.—The responsible Minister may, by the issue of an Order, cause private wireless telegraphs or telephones to be used for the public service or for communications necessary for military purposes.

In cases coming within the purview of this Article the responsible Minister may, where deemed necessary, send officials to carry out the required operations.

ART. 7.—Where the responsible Minister

deems it necessary in the interests of the public communications or on military grounds, he may withdraw his sanction from private wireless telegraphs or telephones or order changes in their equipment.

ART. 8.—Where the responsible Minister deems it necessary for the sake of public security, he may order a restriction of or suspension in the working of or the removal of instruments and accessories belonging to private wireless telegraphs or telephones or wireless telegraphs or telephones installed on foreign vessels.

In cases coming within the purview of this Article, the responsible Minister may, where deemed necessary, send competent officials to seal up instruments and accessories or to effect their removal.

ART. 9.—Where persons responsible for private wireless telegraphs or telephones have contravened this Law, Orders based on this Law, or provisions arising therefrom, the responsible Minister may withdraw his sanction from such wireless telegraphs or telephones or order the suspension of their operations.

ART. 10.—Where sanction has been withdrawn from wireless telegraphs or telephones established by private persons the dismantling of their apparatus and mountings will be required by order of the responsible Minister. This applies also in the case where private wireless telegraphs or telephones have ceased operations.

ART. 11.—Where private wireless telegraphs or telephones or wireless telegraphs or telephones established on foreign vessels have been called upon to deal with signals of distress at sea, such service must not be refused.

ART. 12.—Immediately on receipt of signals of distress at sea, wireless telegraphs or telephones shall acknowledge them and report to the wireless telegraph or telephone most conveniently situated for purposes of rescue.

In cases coming within the purview of this Article, where request has been made for communication on specific matters, such communication should immediately be made regardless of the provisions of this Article.

ART. 13.—Where the responsible Minister has ascertained that any person has illegally set up a wireless telegraph or telephone, he may appoint competent officials to enter such establishment, inspect the apparatus and mountings thereof, effect the removal of instruments and accessories, and take other steps appropriate to the circumstances.

ART. 14.—The Government may, for the purpose of establishing wireless telegraphs or telephones to meet the needs of public communications, require the use of part of a vessel, and in case of necessity order special provision and equipment. Under the provisions of this Article a suitable rent for accommodation and actual cost of special provision and equipment will be paid by the Government on application.

ART. 15.—Matters relating to the administration of wireless telegraphs, wireless telephones, telegraphs, telephones, mails, postal money orders and post office savings, or signals of distress at sea, time signals and meteorological reports may, as determined by an Order be communicated free of charge by the wireless telegraphs or telephones provided for the public service.

ART. 16.—Persons who have set up wireless telegraphs or telephones without permission, or have made use of wireless telegraphs or telephones set up without permission, or those who have made use of private wireless telegraphs or telephones after permission has been withdrawn will be subject to imprisonment with hard labour for a period not exceeding one year or to a fine not exceeding one thousand yen.

In cases coming within the purview of this Article, where wireless telegraphs or telephones have been placed at the disposal of other persons in return for money or commodities, they shall be confiscated, and the total sum of money or value of commodities already disbursed or handed over shall be collected.

ART. 17.—Persons using private wireless telegraphs or telephones for purposes other than those for which they were established will be subject to a fine not exceeding one thousand yen

In cases coming within the purview of this Article, where wireless telegraphs or telephones have been placed at the disposal of other persons in return for money or commodities, they shall be confiscated, and the total sum of money or value of commodities already disbursed or handed over shall be collected.

Persons applying to and having messages sent by private wireless telegraphs or telephones will be subject to a fine not exceeding one hundred yen.

ART. 18.—Persons contravening the provisions of Article 5 or disobeying Orders based on this Law for restricting or suspending the use, changing the equipment of or removing or dismantling wireless telegraphs or telephones will be subject to a fine not exceeding one thousand yen. Where persons engaged in the business of wireless telegraphs or telephones have used them in opposition to Orders for their restriction or suspension, this provision shall apply also to such persons.

ART. 19.—Persons refusing without just cause to furnish the use of wireless telegraphs or telephones under the provisions of Article 6 or of vessels or failing to make special provision or equipment under the provisions of Article 14, will be subject to a fine not exceeding one thousand yen.

ART. 20.—Persons violating the secrecy of wireless telegraph or telephone messages coming under treatment at telegraph or telephone offices will be subject to imprisonment with hard labour for a period not exceeding one year or to a fine not exceeding two hundred yen.

Where persons engaged in the business of wireless telegraphs or telephones have divulged the secrets of messages under the provisions of this Article they will be subject to imprisonment with hard labour for a period not exceeding two years or to a fine not exceeding five hundred yen.

The offences dealt with in this Article must be established by prosecution.

ART. 21.—Persons illegally evading charges connected with wireless telegraphs or telephone or causing other persons to evade them will be subject to a fine not exceeding two hundred yen.

Where persons engaged in the business of wireless telegraphs or telephones have committed acts referred to in the preceding paragraph, they will be subject to imprisonment with hard labour for a period not exceeding one year or to a fine not exceeding five hundred yen.

ART. 22.—Persons dispatching false communications by wireless telegraph or telephone with the object of causing harm to other persons will be subject to imprisonment with hard labour for a period not exceeding two years or to a fine not exceeding fine hundred yen.

Persons dispatching false communications by wireless telegraph or telephone with the object of adversely affecting the public welfare will be subject to penal servitude for a period not exceeding five years or to a fine not exceeding one thousand yen.

Persons dispatching by wireless telegraph or telephone reports of shipping casualties when there are in fact no shipping casualties will be subject to imprisonment with hard labour for a period of not less than three months and not exceeding ten years.

Persons engaged in the business of wireless telegraphs or telephones who have committed acts referred to in the first clause will be subject to imprisonment with hard labour for a period not exceeding five years or a fine not exceeding one thousand yen; in the second clause to penal servitude for a period not exceeding ten years; in the third clause to a term of imprisonment with hard labour of not less than one year.

ART. 23.—Where persons engaged in the business of wireless telegraphs have without just cause opened, damaged, concealed or thrown away telegrams sent by wireless telegraphy and coming under treatment at telegraph offices, or have delivered them to persons other than their proper recipients, they will be subject to penal servitude for a period not exceeding three years or to a fine not exceeding five hundred yen. Provided that cases coming within the purview of Articles 258 and 259 of the Criminal Code shall be dealt with according to that Code.

ART. 24.—Where persons engaged in the business of wireless telegraphs or telephones have, without just cause, neglected to deal with general public telegrams or communications necessary for military purposes, or have caused them to be delayed, they will be subject to imprisonment with hard labour for a period not exceeding one year or to a fine not exceeding two hundred yen.

Where persons engaged in the business of wireless telegraphs or telephones have, without just cause, failed to deal with reports of distress to vessels under the provisions of Articles 11 or 12, or have caused them to be delayed, they will be subject to a term of imprisonment with hard labour of not less than one year.

Persons obstructing communication of reports of distress at sea will similarly be dealt with under the preceding clause.

ART. 25.—Persons obstructing, or committing acts calculated to obstruct, general public communications or communications necessary for military purposes sent by wireless telegraph or telephone will be subject to penal servitude for a period not exceeding seven years or a fine not exceeding five hundred yen.

ART. 26.—Unconsummated attempts to contravene the provisions of the last ten Articles are punishable.

ART. 27.—Persons opposing, hampering or avoiding the competent officials appointed under this Law in the execution of their duty or failing to answer their questions or making false statements during the inspection required under the provisions of Article 13 will be subject to a penalty not exceeding one hundred yen.

ART. 28.—The provisions of the Telegraph Law, Articles 4, 5, 11 to 21, 23, 24 and 45 apply to wireless telegraphs and telephones employed for the general public service and communications necessary for military purposes.

SUPPLEMENTARY REGULATION.—The date of coming into force of this Law will be fixed by Imperial Ordinance.

The above Wireless Telegraph Law came into force on November 1st, 1915. Imperial Ordinance No. 186, October 25th, 1915.

WIRELESS TELEGRAPH REGULATIONS No. 16.

DATED APRIL 8TH, 1908.

ART. 1.—The expression "wireless telegram" means any telegram to be transmitted by wireless telegraphy.

ART. 2.—In the present Regulations the term "coast station" means any telegraph office on land equipped with wireless telegraph apparatus, and the term "ship station" means any telegraph office on board a ship equipped with wireless telegraph apparatus.

ART. 3.—Wireless telegrams shall bear the following abbreviated instruction:—

"R A" in the case of Romanised telegrams.

ART. 4.—The name of a coast station through which a wireless telegram destined for a ship station is to be transmitted shall be indicated within parentheses in the address of the telegram, but such indication shall not be counted in the number of words even in the case of a Romanised telegram.

In case such coast station cannot transmit the telegram, but there is another coast station which is able to do so, the intermediary of of the latter may be resorted to. If a telegram destined for a ship can be delivered direct to the addressee from a telegraph office on land, it may be delivered from such office without the use of wireless telegraphy.

(a) Wireless telegrams to be transmitted by way of intermediate ship station, with the exception of those handed in at a ship station, shall bear the following abbreviated instruction:—

"R S" in the case of Romanised telegrams.

Such intermediary transmission can in no circumstances be made more than once.

ART. 5.—If the sender of a wireless telegram destined for a ship station wishes to indicate the term during which his telegram is to be kept at the coast station, the number of days shall be inserted in the telegram as paid instruction.

Wireless telegrams without such instruction will be retained at the coast station for nine days from the day of handing in. However, in case the transmission of a telegram cannot be effected on account of the ship station's leaving out of the radius of action of the coast station or for any other reasons, the telegram may not be retained, if the retention is deemed unnecessary.

ART. 6.—If the sender wishes to prolong the term of retention mentioned in Art. 5, application to that effect shall be made to the coast station before the expiration of the term. The same applies to further prolongation of the term. In such case, the term of retention will be nine days, unless specially indicated.

The application shall contain the date of handing in, number of characters or words and the names of the sender and addressee of the wireless telegram.

The sender may make the application mentioned in Paragraph 1 through the office of origin. If he wishes it notified to the coast station by telegraph, he shall pay the charge for a paid service telegram for the purpose.

ART. 7.—The transmission of a wireless telegram is to be effected when both the sending and receiving offices are within the guaranteed range of action of each other.

ART. 8.—In the case of ships' distress, wireless telegrams informing the name of the ship in distress, the location and condition of the doomed vessel and any other particulars necessary for rescue, shall be treated by coast or ship stations with absolute priority suspending all other communications.

ART. 9.—Paid service telegrams concerning enquiry, rectification, and stoppage of a wireless telegram to which reply is required can be exchanged only between telegraph offices on land.

ART. 10.—"Urgent telegrams," "redirected telegrams," and "telegrams with acknowledgment of receipt" are admissible between telegraph offices on land.

The sender of a wireless telegram with acknowledgment of receipt will be notified of the date and time at which the coast station has transmitted the telegram to the ship station.

(*a*) Telegrams of the same text originating from the same ship station or from the same telegraph office on land, and passing through the same coast station, may be made a multiple telegram, so far as concerns the transmission between wireless telegraph stations or between telegraph offices on land, as the case may be, no matter whether the addresses of such telegrams be in different localities or they be served by different offices of destination. The Telegram shall bear the following abbreviated instruction instead of that for an ordinary multiple telegram:

"SM" in the case of Romanised telegrams.

Paragraph 2 of Article 4 is not applicable to the multiple telegram mentioned in the preceding parargaph when it is to be distributed to two or more ship stations, unless every copy of such telegram can be transmitted through the same coast station or delivered from the same telegraph office on land.

(*b*) Reply-paid wireless telegrams shall bear the abbreviated instruction for "reply paid," "urgent reply paid," or "collated reply paid," completed by the mention of the prepaid amount. If a prepaid amount is 60 sen in the case of *kana* telegrams, and 75 sen in the case of Romanised telegrams, the mention of the amount is not required.

ART. 11.—Wireless telegrams are subject to the following charge for the operation at a coast station or a ship station in addition to the ordinary telegraph charge. It is provided, however, that the ordinary telegraph charge is not levied on a telegram which is to be transmitted only by wireless telegraphy.

For Government and Ordinary Telegrams:

Coast Charge.—For a *kana* telegram, 20 sen up to fifteen characters; 5 sen for every additional five characters or less. For a Romanised telegram, 25 sen up to five words; 5 sen for every additional word.

Ship Charge.—Ditto.

For Press Telegrams:

Coast Charge.—20 sen for every fifty characters or fraction thereof.

Ship Charge.—Ditto.

(*a*) The following charge is levied in the same way as mentioned in the preceding Article on a supplementary copy of a multiple wireless telegram.

For Government and Ordinary Telegrams:

Coast Charge.—For a *kana* telegram, 10 sen; for a Romanised telegram, 15 sen.

Ship Charge.—Ditto.

For Press Telegrams:

Coast Charge.—One-half the charge for the original telegram.

Ship Charge.—Ditto.

(*b*) If, in the case where Paragraph 2 of Article 4 is applied, the amount paid fall insufficient, the deficiency is collected from the addressee. In the case of a multiple telegram the amount to be collected is divided by the number of copies, and the quotient shall be the sum collected from one addressee.

ART. 12.—Wireless telegrams are free from special charge applicable to telegrams handed out of the ordinary hours of duty.

ART. 13.—The following charges for a wireless telegram shall be refunded less the amount which had been appropriated for another charge:—

(1) The charges pertaining to the transmission by wireless telegraphy when not effected.

(2) The charges pertaining to the transmission on telegraph lines when not effected.

ART. 14.—An application for the refund of charges for a wireless telegram handed in at a ship station may be sent in through any telegraph office.

ART. 15.—The term of retention mentioned in Articles 5 and 6 is not reckoned in the period of delay giving rise to refunds.

ART. 16.—Matters not expressly provided for in this Ordinance are subject to the other regulations relating to inland telegrams. Provided that the Regulations relating to Telegrams, Articles 71, 114, 121, 126 to 130, 146 to 148, 148 (vi) to 148 (x), Ordinance No. 46, issued by the Department of Communications in September, 1900, shall not apply.

(*a*) With the exception of Article 9 to Article 10 (*b*) and the proviso in Article 16, the regulations in this Ordinance shall apply in the treatment of connected service between wireless telegraphs and the reciprocal dispatch and receipt of telegrams on land. Provided that, if deemed necessary by the Department of Communications, charges for such service shall be specially fixed.

The treatment of, and special fixing of charges for, wireless telegrams referred to in the preceding clause will be separately notified.

FOREIGN WIRELESS TELEGRAPH REGULATIONS.

The following supplementary regulations came into operation on July 1st, 1913, and apply to all Japanese possessions:

ART. 1.—Foreign wireless telegrams are understood to be those which are treated according to the regulations of the London International Radiotelegraphic Convention or to the regulations concerning the radiotelegraphic service concluded between the Government of the Empire and foreign Governments or companies.

ART. 2.—The rates to be charged for foreign messages through Japanese coast and ship stations are as follows:—

(1) Coast station rate, 24 yen (fr. 0.60) per word.

(2) Ship station rate, 16 yen (fr. 0.40) per word.

The coast station rate referred to in the

preceding parargraph includes the rate applicable to the transmission on telegraph lines for wireless messages originating in or destined for the Japanese Empire or Southern Manchuria or for ships' stations transmitted through Japanese coast stations and the Japanese telegraph service. As regards urgent wireless messages for transmission over land lines, an extra 10 yen (fr. 0.25) will be charged.

ART. 3.—The rates to be charged for foreign radiotelegrams through foreign coast or ship stations will be indicated separately.

ART. 4.—The ordinary rate for foreign wireless messages accepted by a Japanese ship station for transmission through a foreign coast station will be fixed by the owners of the said foreign coast station.

ART. 5.—For the acknowledgment of receipt of foreign wireless messages handed in at a Japanese telegraph office and destined for a ship station and transmitted thereto through a Japanese wireless coast station, the rate for the acknowledgment of receipt of interior telegrams for transmission between Japan and Southern Manchuria will be charged.

ART. 6.—At the request of the receiver, or of the person empowered to receive messages for and on behalf of the receiver, wireless messages may be retransmitted only over Japanese land lines.

ART. 7.—When the Japanese coast station given by the sender of a foreign wireless message destined for a ship cannot transmit the said message it may be transmitted through another Japanese coast station, provided such station is suitable for the purpose. This provision also applies in case the Japanese ship station cannot transmit a foreign wireless message to a Japanese coast station mentioned by the sender and where another Japanese coast station exists and which is capable of performing the duty.

ART. 8.—Japanese ship stations cancel foreign wireless messages when they are not in a position to transmit the same to the corresponding stations.

ART. 9. (i)—Should a foreign wireless message be cancelled in accordance with Article 8, the sender shall be at once advised and the money paid by him returned without delay.

(ii) Foreign wireless telegrams passing between the Imperial [Japanese] Telegraph Office in Shanghai and Imperial ship stations through the intermediary of Imperial coast stations and, as circumstances require, ship stations may be entered in the Japanese language.

(iii) Article 3, Article 4, clauses i and ii and Article 5, clause i, of the Wireless Telegraph Regulations, Ordinance No. 16 of the Department of Communications, issued in April 1908, provide for foreign wireless telegrams in Japanese.

(iv) Reply prepaid foreign wireless telegrams in Japanese must be marked "reply prepaid," followed by the amount paid for reply.

(v) Foreign wireless telegrams dispatched or received at the places announced separately will be transmitted through the intermediary of telegraph offices specially indicated.

(vi) The treatment of foreign wireless telegrams in accordance with the preceding Article is subject to the general regulations relating to foreign telegrams.

ART. 10.—Matters not specially provided for in this Ordinance, as regards Japanese telegrams, foreign telegrams in Japanese, and other items, are subject to the general regulations relating to foreign telegrams.

REGULATIONS RELATING TO PRIVATE WIRELESS TELEGRAPHS.

(Ordinance No. 46, Department of Communications, October 26th, 1915.)

ART. 1.—The words "disconnected from public communications" in clauses iii. and iv. Article 2, of the Wireless Telegraph Law mean that the location for fitting up private wireless telegraph apparatus must be outside the boundaries of direct telegram delivery or telephone subscription or on vessels on which no telegraph office is established.

ART. 2.—Wireless telegraphs set up in accordance with clause v., Article 1, of the Wireless Telegraph Law are limited to provision for experiments connected with the science and apparatus of wireless telegraphy.

ART. 3.—Permission will be given to the furnishing of vessels with aerial apparatus and its use for wireless telegraphy by private persons.

ART. 4.—The apparatus and equipment of private wireless telegraphs, except in specially indicated cases, will be required to conform with the following clauses:—

(i) The apparatus must be capable of transmitting eighty *kana* characters or twenty European words per minute.

(ii) The receiving apparatus must be capable of receiving messages transmitted on electric wave-lengths of from 100 to 1,800 metres.

(iii) The power supplied to the transmitting circuit corresponding to the distance required to be reached in the daytime must not exceed the following standards (measured at the primary coil of the transformer or at some point corresponding thereto).

Required day-time distance.	Electric power.
20 naut. miles, not exceeding	¼ kilovolt amps.
100 " " "	½ " "
200 " " "	1 " "
300 " " "	2 " "
400 " " "	3 " "
500 " " "	7 " "

(iv) The electric waves should be pure and suffer but little diminution. The installation must be capable of using waves of such length as may be specifically indicated between 100 and 1,800 metres.

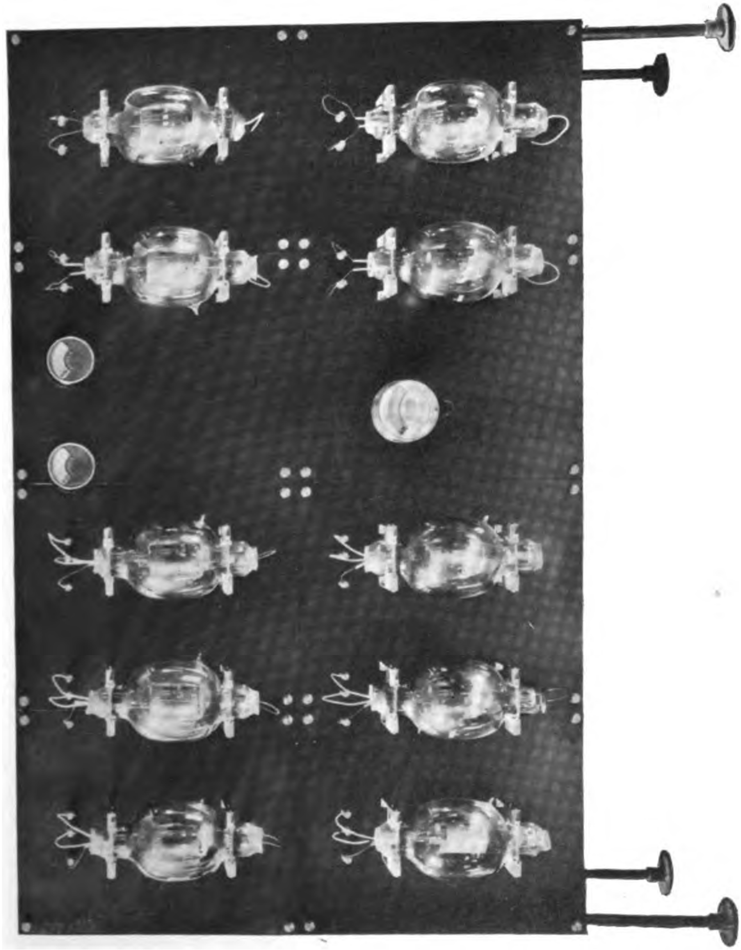
ART. 5.—The establishment and maintenance of private wireless telegraphs required to be installed at certain telegraph offices in accordance with clause iii., Article 2, of the Wireless Telegraph Law will be carried out by the Communications Office having local jurisdiction or a first-class post office dealing with branch administrative business.

Persons establishing private wireless telegraphs under this Article must be responsible for the supply of and expenditure on articles required for their establishment in accordance with details furnished by the Communications Office having local jurisdiction or the first-class post office dealing with branch administrative business, and must further pay expenses of maintenance.

ART. 6.—Persons proposing to establish private wireless telegraphs must append to their application documents inscribed with particulars under the following headings, submitting the whole to the Minister of Communications. Changes occurring under headings (i.) to (iv.) must similarly be notified.

(i.) The object of the installation and grounds for its necessity.

(ii.) Site of installation (full address or name of vessel).



MARCONI 25 K.W. PANEL TYPE WIRELESS TRANSMITTER (CONTINUOUS WAVE).

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(iii.) Plan of construction (nature of apparatus, method of mounting, height of electric standards [masts], electric power, distance required to be reached in the daytime, details of supplementary equipment where required).

(iv.) Hours open for operation.

(v.) Nature of vessel, gross tonnage, owners, course navigated, and regular port of mooring (the principal home port of anchorage should be taken as the regular port of mooring).

(vi.) Time required for completion.

The site of installation on vessels under heading (ii.) and the plan of construction under heading (iii.) should be illustrated by separate drawings.

ART. 7.—Where changes have been made in details under headings (v. and vi.) of the preceding Article, they must at once be notified to the Minister of Communications. In the case where the regular port of mooring has been changed such change must be notified also to the Communications Office having jurisdiction over, or the first-class post office dealing with branch administrative business at, the former port of mooring.

ART. 8.—When the fitting up and construction of a private wireless telegraph have been completed, the fact must at once be notified to the Minister of Communications.

ART. 9.—When the Minister of Communications has received a report under the preceding Article, he will send inspectors to examine the apparatus and fittings, after which a licence will be granted. Provided that where a special inspection is not deemed necessary a licence may be issued forthwith. If deemed specially desirable by the inspectors under this Article a temporary licence will be issued for the opening of operations by the private wireless telegraph concerned.

ART. 10.—When a private wireless telegraph establishment is to be closed up, a notification to this effect must be sent to the Minister of Communications seven days earlier. Similar notice must be given in the case of suspension of a private wireless telegraph establishment.

ART. 11.—When a private wireless telegraph establishment has been closed up, the aerials must be removed immediately, and, unless special instructions have been given, apparatus specially pertaining to wireless telegraphy—dynamos, secondary electric batteries, distributing apparatus, electromotors, motor generators, transformers, electric standards, transmitters, receivers, meters, etc.—must be dismantled and removed within ten days. Where sanction to a private wireless telegraph has been withdrawn the same provision applies.

ART. 12.—When a change is made in the proprietorship of a wireless telegraph installation, a written application for permission, jointly signed with both old and new names, must be submitted to the Minister of Communications.

Where, owing to succession on the decease of the proprietor or other causes, joint signatures cannot be obtained, a certificate to this effect must be appended to the application.

ART. 13.—The length of electric waves and the call signal to be adopted by a private wireless telegraph will be decided by the Minister of Communications.

ART. 14.—When a private wireless telegraph has been sanctioned by the Minister of Communications details of the installation under the following headings will be officially announced. This applies also to changes effected therein:

(i.) Name of person setting up installation.

(ii.) Object of installation.

(iii.) Site of establishment.

(iv.) Call signal.

(v.) Ordinary range of distance.

(vi.) Method of fitting up.

(vii.) Electric wave-length used.

(viii.) Hours open for operation.

ART. 15.—Operators of private wireless telegraphs are required to possess the proper qualifications in conformity with the Regulations relating to Qualifying Examinations for Operators of Private Wireless Telegraphs. Provided that exception be made in the case of operators of private wireless telegraphs established in accordance with clause v., Article 2, of the Wireless Telegraph Law, who have received the special sanction of the Minister of Communications.

ART. 16.—Proprietors of private wireless telegraphs must notify the Minister of Communications of all appointments or dismissals of operators in the employ. In the case of appointments, copies of antecedents form, certificate of physical examination and certificate of eligibility awarded on qualifying examination for operators of private wireless telegraphs must be appended.

ART. 17.—Where the Minister of Communications has ascertained that an operator of a private wireless telegraph is incompetent in the performance of his duties he may order the dismissal of such operator.

ART. 18.—A private wireless telegraph establishment shall not begin operations until a licence or temporary licence has been received in accordance with Article 9.

ART. 19.—When a private wireless telegraph establishment has begun operations the Minister of Communications must at once be notified accordingly. Provided that when the installation is one set up in accordance with clause iii., Article 2, of the Wireless Telegraph Law, notification will be required seven days before the opening of operations.

This Article applies also to reopening of operations after notification of suspension has been made in accordance with Article 10.

ART. 20.—The employment of private wireless telegraphs is required to conform with the following paragraphs. Provided that exception be made in the case of communications falling within the purview of Articles 22 to 24.

(i.) Only when not causing disturbance to messages sent by the general public or to military communications.

(ii.) In the case of installations on vessels, only whilst on voyage.

(iii.) In the case of installations set up in conformity with clause v., Article 2, of the Wireless Telegraph Law, only when not causing disturbance to communications from other wireless telegraphs.

ART. 21.—Communications sent by private wireless telegraphs must be in Morse symbols, and the method of transmission, except where special instructions are issued, must conform with the following provisions:

(i.) Before making a call, the receiver must be regulated to the best degree of perception to determine whether a message is already in transmission. A call must not be made until such message, if any, is completed.

(ii.) When making a call the "begin

communication" signal ▬●▬●▬ must first be sent, followed by the call signal of the party signalled, repeated three times, then the introductory signal ▬● ● ● followed by own call signal, repeated three times.

(iii.) When the signalled party replies, he must send the "begin communication" signal ▬●▬●▬ followed by the signalling party's call signal repeated three times, then the introductory signal ▬● ● ● followed by his own call signal and the "clear for transmission" signal ▬●▬. This applies also in the case of a reply to the call under provision vi.

(iv.) When there is no reply from the signalled party to the call made under provision ii., repeat the signals in proper order three times at intervals of two minutes. If there is still no reply allow fifteen minutes to elapse, then make the call again in the same manner.

(v.) When communicating with the signalled party by means of the international shipping signals, continue the call by sending the international shipping signal PRB.

(vi.) When wishing to detecta wireless message within own range, use the "Inquiry signal" ▬●▬●▬▬●▬ and make the call provided under (ii.).

(vii.) When the signalled party replies, begin the required message immediately, and at its ending send the "end communication" signal ●▬●▬● and own call signal, followed by the "clear for transmission" signal ▬●▬

(viii.) When the signalled party has comprehended the message, he must immediately signify its receipt by sending the signal "understand communication" ▬▬▬▬●▬

(ix.) When mutual messages have been completed, both parties must exchange the "finished" signal ●●●▬●▬ and their own call signals.

(x.) When in the case of an experimental message sent out by a wireless telegraph established in accordance with clause v., Article 2, of the Wireless Telegraph Law the call signal of another party is not required, repeat own call signal three times and after ascertaining that there is no danger of hindering another message, begin the required communication, and at its ending send the "end communication" signal ●▬●▬● and own call signal. Provided that such communication must not exceed twenty minutes in duration.

ART. 22.—When dispatching a signal of distress at sea by private wireless telegraph, the preliminary "ship in danger" signal ●●●▬▬▬●●● should be repeated at, frequent intervals according to circumstances followed by the name of vessel in distress, position, and details of conditions and other matters likely to facilitate rescue. If it is desired to get into touch with a specified wireless telegraph a continued series of the "ship in danger" signal ●●●▬▬▬●●● should be followed by the call signal of the station signalled.

ART. 23.—When a private wireless telegraph detects the "ship in danger" signal ●●●▬▬▬●●● accompanying a message of distress at sea, it must suspend all other messages and immediately reply, and report details in the order specified in the last Article to another wireless telegraph situated at the most convenient point for purposes of rescue. Provided that where the message of distress includes a request for specified action before transmitting the report or for specified items to be included therein, such request must be complied with.

In the case of a continued series of the "ship in danger" signal ●●●▬▬▬●●● being followed by the call signal of a specified station, only in the event of no reply being received therefrom should the responsive steps be taken prescribed in the last paragraph.

ART. 24.—When sending out by private wireless telegraph a necessary warning of danger to navigation, repeat the preliminary navigation alarm signal TTT ten times at short intervals, then transmit necessary details, after which, allowing an interval of ten minutes to elapse, repeat the alarm three times. When a private wireless telegraph detects the navigation alarm signal TTT accompanying a necessary warning of danger to navigation, it must suspend all other messages.

ART. 25.—A private wireless telegraph shall not be prevented, in cases of messages coming under the provisions of the last three Articles only, from exceeding the prescribed limit of electric power or wave-length used. Provided that, immediately after such use, the prescribed limits shall be reverted to.

ART. 26.—When a telegraph office has sent out by wireless telegraphy the private "suspend communication" signal ▬●● ●●▬ all private wireless telegraph messages within such office's range of distance must be suspended until the private "renew communication" signal ●▬▬●● ▬▬● is issued.

ART. 27.—A private wireless telegraph shall not be prevented, in the cases referred to below, from operating outside the objects for which it was established.

(i.) When deemed necessary to exchange messages with other wireless telegraphs concerning communications coming within the purview of Articles 22 to 24.

(ii.) When deemed necessary to exchange messages with other wireless telegraphs in connection withm eteorological and time signals or the adjustment of apparatus.

(iii.) When rendered necessary to communicate with a telegraph office equipped with wireless telegraph apparatus, following instructions issued by such office.

(iv.) When deemed necessary to exchange messages with military wireless telegraphs to meet the requirements of military communications.

ART. 28.—When a private wireless telegraph has received a request from another wireless telegraph to exchange messages for the purpose of adjusting apparatus, it shall respond thereto, provided there is no danger of obstruction.

ART. 29.—The Minister of Communications shall specially instruct the Wireless Telegraph Inspection Bureau to test a private wireless telegraph with a view to ascertaining whether it is properly employed and whether its communications are in order.

ART. 30.—When sending instructions to a private wireless telegraph relating to its communications, the Wireless Telegraph Inspection Bureau will prefix to its call signal the wireless telegraph inspecting signal ●▬●●●●▬● in order to distinguish its message from general communications.

ART. 31.—Where an order is sent direct to an operator relating to the restriction or suspension of operations by the private wireless

telegraph operated by him or the removal of its apparatus and accessories, the person responsible for the installation will be separately notified.

Art. 32.—When a vessel with a private wireless telegraph on board comes within the wireless telegraph range of a telegraph office it must briefly report to such office its direction and distance therefrom, together with the direction in which the vessel is moving. When about to withdraw from the range of such office, a similar report must be sent.

Art. 33.—The person responsible for a private wireless telegraph must report to the Minister of Communications, at the same time giving details, on all circumstances falling under the following headings:

(i.) When special restrictions have been imposed on the equipment and operation of the wireless telegraph concerned in foreign waters. Provided that exception be made where such restriction has been officially announced.

(ii.) When messages have been sent in accordance with Articles 22–24.

(iii.) When cases of contravention of the Wireless Telegraph Law or the Regulations connected therewith on the part of a private or foreign wireless telegraph have been detected.

(iv.) When matters have arisen calling for special attention in regard to the results of wireless telegraphy or other features.

Art. 34.—The person responsible for a private wireless telegraph must keep a journal and cause the operator to record therein the items coming under the following headings:

(i.) Time of beginning and end of messages; and wireless station signalled.

(ii.) Nature of message.

(iii.) The circumstances coming under Articles 27 and 33, and the steps taken in accordance therewith.

(iv.) In the case of private wireless telegraphs established in accordance with Clause v., Article 2, of the Wireless Telegraph Law, the results of experiments.

(v.) In addition to the matters under the above headings, references for future use.

Communication journals as prescribed in this Article must be preserved for fifteen months, counting from the month following that in which they are completed.

Art. 35.—The person responsible for a private wireless telegraph must affix in his operating room, where they can easily be seen, his certificate, together with copies of the penal clauses of the Wireless Telegraph Law and a list of the essential objects for which the installation was established.

Art. 36.—The Minister of Communications will from time to time specially send officials to examine reports, and documents connected therewith, on the apparatus, mounting and operations of private wireless telegraphs. In such cases the officials concerned will carry proof of their competency.

Art. 37.—Documents to be sent in under the provisions of Articles 7, 8, 10, and 19 may be replaced by telegrams.

Art. 38.—Documents to be submitted under this Ordinance to the Minister of Communications, with the exception of those coming under the preceding Article, must all be passed through the Communications Office having jurisdiction over, or the first-class post office dealing with branch administrative business at, the place of a land installation or the regular port of mooring of a vessel having an installation.

Supplementary Regulations.

Art. 39.—The provisions of Articles 1 to 3, 5 to 14, 18 to 20, 22 to 38 apply to private wireless telephones, and the provisions of Articles 22 to 24, 26, 29 to 31 and 36 apply to wireless telegraphs or telephones installed on foreign vessels.

Art. 40.—This Ordinance comes into force on November 1st, 1915.

Regulations relating to Qualifying Examinations for Operators of Private Wireless Telegraphs.

E (Ordinance No. 48. of the Department of Communications, October 26th, 1915).

Art. 1.—Persons aged seventeen or above qualifying for posts as operators of private wireless telegraphs will be examined and approved according to the following classification:

Class I.—Persons capable of operating private wireless telegraphs set up under the provisions of the Wireless Telegraph Law, Article 2.

Class II.—Persons capable of acting as assistant operators of private wireless telegraphs set up under the provisions of the Wireless Telegraph Law, Article 2 (except those set up under clause iii.) and of private wireless telegraphs set up under the provisions of clause iii. of the same Article.

Class III.—Persons capable of acting as assistant operators of private wireless telegraphs set up under the provisions of the Wireless Telegraph Law, Article 2, clause v, and of private wireless telegraphs set up under the provisions of any one of the clauses of the same Article.

Art. 2.—Examinations will be carried out by the Qualifying Examination Committee for Operators of Private Wireless Telegraphs appointed by the Minister of Communications. The subjects for examination are as follow:

(1) Wireless Telegraphy: Theory (for Class I. only), adjustment and use of apparatus (for Classes I. and II. only).

(2) Practical Electric Telegraphy: Transmission of a message in Japanese and a European language and reception of a message by sounder. Standard of speed to be—for Class I., eighty *katakana* characters (syllables) or twenty European words per minute; and for Classes II. and III., fifty *katakana* characters (syllables) or twelve European words per minute.

(3) Wireless Telegraph Laws and Regulations: General Laws and Ordinances relating to wireless telegraphs (for Classes I. and II. only); Laws and Ordinances relating to private wireless telegraphs (for Class III. only).

(4) English language: Rudiments (for Classes I. and II. only).

Art. 3.—The Minister of Communications will award certificates of eligibility (form No. 1) to successful candidates in the examination.

Art. 4.—Persons who have had not less than two years' practical experience in the public telegraph or wireless telegraph service or in military wireless telegraphy may be granted certificates of eligibility according to the following classification without undergoing examination, on review by the Qualifying Examination Committee for Operators of Private Wireless Telegraphs.

(1) Persons engaged in the public wireless telegraph service—for Class I. or lower.

(2) Persons engaged in military wireless telegraphy—for Class II. or lower.

(3) Persons engaged in the public telegraph service—for Class III.

These provisions apply also in the case of persons holding second or third-class certificates of eligibility according to the following classification:

(1) Persons holding second-class certificates of eligibility who have been engaged for not less than two years as assistant operators of private wireless telegraphs established in accordance with the Wireless Telegraph Law, Article 2, clause iii.—for Class I.

(2) Persons holding third-class certificates of eligibility who have been engaged for not less than two years as assistant operators of private wireless telegraphs—for Class II.

ART. 5.—Persons holding a certificate of study for completion of training in wireless telegraphy, practical electric telegraphy, and Wireless Telegraph Laws and Regulations, in accordance with the classifications determined by the Ministry of Communications, with the object of engaging in wireless telegraphy, may be granted certificates of eligibility, for Class I. or lower, on review.

ART. 6.—Examinations will be held annually. Date, place and other details thereof will be announced in the *Official Gazette*. Provided that if deemed necessary by the Minister of Communications extra examinations may be held at special times.

Reviews by the examiners will take place according to circumstances.

ART. 7.—Candidates for examination must submit to the Minister of Communications before the appointed date an application in writing (form No. 2), appending thereto a statement of antecedents (form No. 3), an abstract of the Census Register, and a photograph.

ART. 8.—Candidates for examination must pay an examination fee of two yen in Class I. and one yen in Classes II. and III., affixing to the application form a revenue stamp for the amount.

Fees already paid for examination cannot be refunded to candidates failing to pass the examination or to those disqualified under the provisions of Article 9.

ART. 9.—Where the Qualifying Examination Committee for Operators of Private Wireless Telegraphs have detected false statements in a form of antecedents or improper behaviour during examination, they will disqualify the candidate concerned.

Where the facts of a case coming under the provisions of this Article are discovered after the candidate has passed the examination, his certificate of eligibility will be invalidated.

ART. 10.—The names of successful candidates will be announced in the *Official Gazette*.

ART. 11.—Where a holder of a certificate of eligibility has changed his name or lost or damaged his certificate, he may apply to the Minister of Communications for a revision or renewal thereof.

Applicants under this provision must pay a fee of thirty sen for revision or renewal of certificate affixing to the letter of application a revenue stamp for the amount.

Additional Regulation.

This Ordinance comes into force on November 1st, 1915.

(Form No. 1.)

Certificate of Eligibility awarded on Qualifying Examination for Operators of Private Wireless Telegraphs.

Name ....
Address..........................
Date of Birth ....
Eligible for Class No.......

This is to certify that the above-named is qualified in the class designated in accordance with the Regulations relating to Qualifying Examinations for Operators of Private Wireless Telegraphs.

Name (seal) ....
President of Qualifying Examination Committee for Operators of Private Wireless Telegraphs.
Date......................

The certification of the President of the Qualifying Examination Committee for Operators of Private Wireless Telegraphs is sanctioned and a certificate of eligibility hereby granted.

(This certificate of eligibility falls within the category of Class A (B) certificates under the provisions of the Regulations relating to Business annexed to the International Wireless Telegraph Convention of London, and the holder of this certificate declares his acceptance of the obligation strictly to preserve the secrecy of communications under the whole of the Regulations.)

(Seal) Minister of Communications.
Date ....

Notes:—

(1) On the back, in the cases of Classes I. and II., appears a translation in a foreign language.

(2) The paragraph in parentheses appears in the cases of Classes I. and II.

(Form No. 2.)

Memorandum (on Mino paper).

Form of Application for Qualifying Examination for Operators of Private Wireless Telegraphs.

Affix Revenue Stamp here.	Name of applicant ....
	Address......................
	Date of birth ....
	Class qualifying for: No........

I am desirous of undergoing {examination to / review by examiners to} qualify for the above Class in accordance with {the provisions of the / Article 4 (or 5) of the} Regulations relating to Qualifying Examinations for Operators of Private Wireless Telegraphs, and append the documents required by Article 7 of the same Regulations.

Name (seal) ....
Present address ....
Date ....

To the Minister of Communications.

(Form No. 3.)

Memorandum (on Mino paper).

Statement of Antecedents.

Name ....
Social status and domicile............
Date of birth ....

Education:—

School........ Section...... Date of entry.....
School........ Section...... Date of completion of studies, graduation, or leaving school............(abstract of graduation certificate or certificate of study appended).

Occupation :—

Government office or private firm (fill in name)........ Date of Entry.......

Occupation followed (references from the Government office [or firm] appended)..........

Awards or penalties :—

Description.......... Date........

The above is a correct statement.

Name (seal) ....

Present address ....

Date ....

Note.—A detailed statement of matters relating to telegraphy or wireless telegraphy is required.

Attention is directed to the following points :

(1) The applicant's name must be inscribed on the photograph.

(2) The revenue stamp must not be cancelled.

KOREA

(See JAPAN.)

KWANTUNG

(See JAPAN.)

LADRONE ISLANDS

(See map on p. 129.)

LEEWARD ISLANDS

THE Leeward Islands consist of the five Presidencies of : (1) Antigua with Barbuda and Redonda; (2) St. Kitts and Nevis with Anguilla; (3 Dominica; (4) Montserrat; and (5) The Virgin Islands with Sombrero. The Colony is under one Governor who resides at Antigua. The Presidencies of St. Kitts and Dominica are under Administrators and the Presidencies of Montserrat and the Virgin Islands under Commissioners, the Administrators and Commissioners being subject to the instructions of the Governor. The administrative centre and the residence of the Governor-in-Chief is St. John's, Antigua, lying in 17° 6′ N. latitude, 61° 45′ W. longitude.

ADMINISTRATION.

Wireless telegraphy is administered under :

A—Ordinance No. 11, 1913.

B—Regulations made thereunder in 1913, and

C—Further regulations dated 28th August, 1917.

Similar legislation is in force in the other islands under the same administration.

ANTIGUA, NO. 11 OF 1913.

An Ordinance to consolidate and amend the law relating to wireless telegraphy.

Be it ordained by the Governor and Legislative Council of Antigua as follows :

1. This Ordinance may be cited for all purposes as "The Wireless Telegraphy Consolidation Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received ; Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor-in-Council.

(2) Every such licence shall be in such form and for such period as the Governor-in-Council may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. No person shall work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Presidency, otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor-in-Council may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(2) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time in the opinion of the Governor-in-Council an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in territorial waters of the Presidency shall be subject to such further regulations as may be made by the Governor-in-Council from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in

any place, or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the Chief Inspector of Police and named in the warrant and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person guilty of an offence against any provisions of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings under this Ordinance shall be taken on the complaint of the Chief Inspector of Police or of any person thereto authorised by him in writing.

8. Ordinance No. 12 of 1903 entitled "An Ordinance to regulate the establishment of Wireless Telegraphy" and Ordinance No. 7 of 1913 entitled "An Ordinance to amend the Wireless Telegraphy Ordinance, 1903," are hereby repealed.

Passed the Legislative Council the 14th day of October, 1913.

Dated at Antigua the 23rd day of October 1913, in the fourth year of His Majesty's reign.

SCHEDULE—Section 5 (2).

Regulations.

B 1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Presidency shall be worked in such a way as not to interfere with

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Presidency or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Presidency except with the special or general permission of the Governor-in-Council.

4. For the purpose of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

REGULATIONS.

Made by the Governor-in-Council.

C Whereas it is provided by section 5 (3) of the Wireless Telegraphy Consolidation Ordinance, 1913, that if at any time, in the opinion of the Governor-in-Council, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy the use of wireless telegraphy on board mer- chant ships while in the territorial waters of the Presidency shall be subject to such further regulations as may be made by the Governor-in-Council from time to time; and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

And whereas in my opinion such emergency as aforesaid has arisen:

Now I do hereby rescind the further Regulations made under the said Ordinance on the 8th day of September, 1914, and make the following Regulations, namely:—

1. The radiotelegraph stations on board ships (other than ships requisitioned by His Majesty's Government) shall not be worked whilst such ships are within a harbour of the Presidency and for the proper enforcement of the above.

(*a*) Ships of British register in harbours of the Presidency must completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, in such a manner as to show that they are properly disconnected.

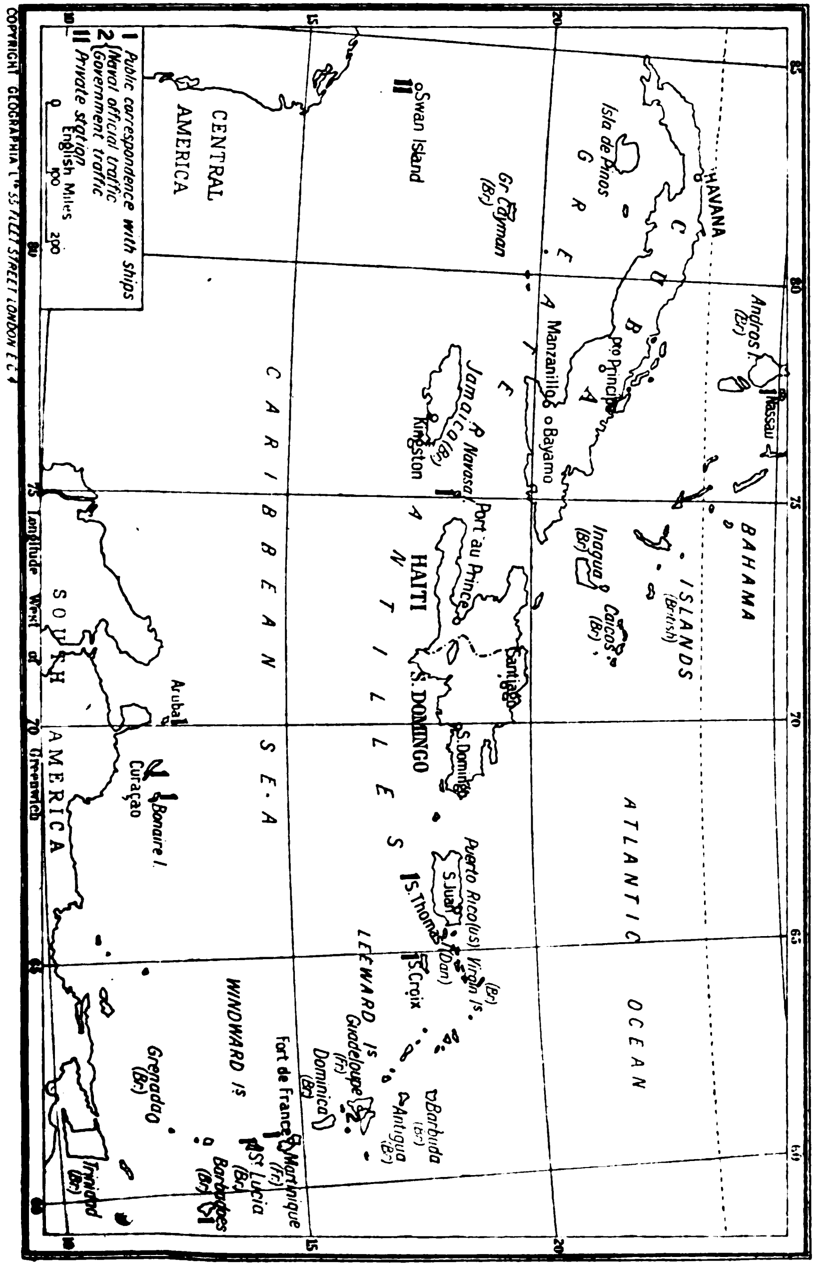
(*b*) Ships of foreign register in a harbour of the Presidency must, subject to the provisions of the following sub-sections (*c*) take down their aerial wires completely and disconnect the same from their radiotelegraph apparatus.

(*c*) Ships of foreign register remaining in the harbour of the Presidency for less than twelve hours may at the discretion of the Governor be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of sub-section (*a*) of this Regulation.

2. The Governor may at his discretion direct that the operating room of any ship (other than a ship requisitioned by His Majesty's Government) in a harbour of the Presidency be sealed or order any other steps to be taken affecting the radiotelegraph station on board any such ship.

3. Every person failing to obey and conform with the provisions of these Regulations or with any directions given by the Governor under the same shall be guilty of an offence and shall be liable on summary conviction to the penalties under the Ordinance provided.

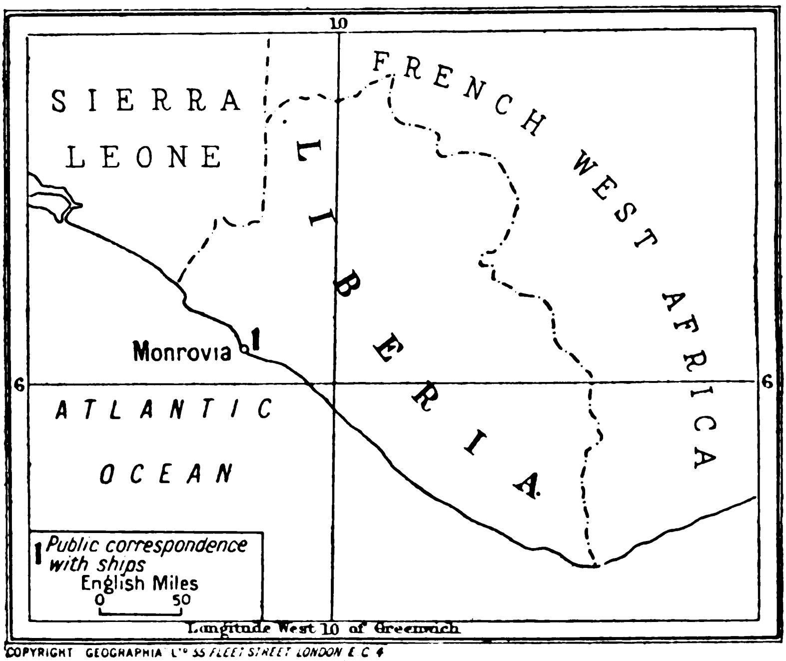
Made by the Governor-in-Council, under section 5 (3) of the Wireless Telegraphy Consolidation Ordinance, 1913, this 28th day of August, 1917.


1 Public correspondence with ships
2 Naval official traffic
Government traffic
II Private station
English Miles
0 100 200
CENTRAL AMERICA
Swan Island
Isla de Pinos
Gr. Cayman (Br.)
HAVANA
CUBA
GREATER ANTILLES
Manzanillo
Pto Principe
Bayamo
Andros I. (Br.)
Nassau
BAHAMA ISLANDS (British)
Inagua (Br.)
Caicos (Br.)
Jamaica (Br.)
Kingston
Navasa
Port au Prince
HAITI
Santiago
S. DOMINGO
S. Domingo
CARIBBEAN SEA
ATLANTIC OCEAN
Aruba
Curaçao
Bonaire I.
Puerto Rico (U.S.)
S. Juan
S. Thomas
S. Croix
(Dan.)
Virgin Is. (Br.)
LEEWARD Is
Guadeloupe (Fr.)
Dominica (Br.)
Barbuda (Br.)
Antigua (Br.)
WINDWARD Is
Fort de France
Martinique (Fr.)
St. Lucia (Br.)
Barbados (Br.)
Grenada (Br.)
Trinidad (Br.)
SOUTH AMERICA
Longitude West of Greenwich
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LIBERIA

THE only independent "black" republic in the Old World, owes its inception (in 1847) to an effort on the part of American and European slave emancipators to found a country for freed negro slaves in the continent which formed the original home of the race. It lies on the west coast of Africa, approximately between 5° and 10° N. latitude and 7° and 11° W. longitude, possessing about 350 miles of coast line. The executive authority is vested in a President, a Vice-President, and a Council of six Ministers, and the legislative power in a Parliament of two Houses, known respectively as the Senate and House of Representatives.

Wireless telegraphy is represented by two stations situated at Monrovia, one of which is open for public correspondence with ships. Their position is indicated on the annexed map.



MADAGASCAR

(See FRANCE.)

MALAYA

(See map on p. 129.)

Comprising (1) The Federated Malay States;
(2) Malay States not included in the Federation.

(1) Federated States.

THE first division under which the component parts of Malaya are grouped consists of the Federated States. They lie on the mainland of the Malay Peninsula, and are closely connected with the Straits Settlements. They

comprise the States of Perak, Selangor, Negri Sembilan, and Pahang, which have by a Treaty dated 1895 renewed their arrangements with the British Government. They are administered under the advice of a Chief Secretary with residents in each State, subject to the instructions of the High Commissioner, who is also Governor of the Straits Settlements, and resides at Singapore. The Chief Secretary to the Government is located at Kuala Lumpur. Their total area amounts to 27,506 square miles.

There are two wireless stations open for public service with ships and one for Government traffic only.

ADMINISTRATION.

Wireless telegraphy is regulated by:—

A—Enactment No. 7 of 1913, and
B—Rules under the above Enactment.

The text of both the enactment and the rules made under its provisions will be found below.

ENACTMENT NO. 7 OF 1913.

A An Enactment to make better provision for the regulation of Wireless Telegraphy.

July 30th, 1913.

It is hereby enacted by the Rulers of the Federated Malay States in Council as follows:—

1. (1) This enactment may be cited as "The Wireless Telegraphy Enactment, 1913," and shall come into force upon the publication thereof in the *Gazette*.

(2) The Enactments specified in the schedule are amended by deleting from the interpretation of "Telegraph" in section 2 of each of the said Enactments the words "whether worked with or without lines of wires."

2. (1) In this Enactment the expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraphs Enactments, 1905," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received;

The expression "locally owned ship" means a ship owned wholly by the Government of the Federated Malay States or of any of them or by subjects of any of the rulers of the said States or by bodies corporate established under and subject to the laws of the said States or of any of them and having their principal place of business within the said States or by any person residing within the said States.

(2) Nothing in this Enactment shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Chief Secretary to Government may, whenever he shall deem it expedient to do so, license the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Federated Malay States or on board any locally owned ship.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Federated Malay States or on board any locally owned ship except under and in accordance with a licence granted in that behalf by the Chief Secretary to Government.

(2) Every such licence shall be in such form and for such period as the Chief Secretary to Government may determine and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Chief Secretary to Government shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Enactment except with the previous sanction of the Public Prosecutor.

(2) If a Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Chief Secretary to Government may make rules for all or any of the following matters:—

(*a*) for prescribing the form and manner in which applications for licences under this Enactment are to be made;

(*b*) for prescribing the fees payable on the grant of any licence;

(*c*) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship, a British or a foreign ship, in the waters of the Federated Malay States shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed or worked in the Federated Malay States or the waters thereof and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(*d*) for prohibiting except with the special or general permission of the Director of Posts and Telegraphs, Federated Malay

States, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship, a British or a foreign ship, whilst such ship is in any of the harbours of the Federated Malay States;

(*e*) for prohibiting or regulating, in case at any time in the opinion of the Chief Secretary to Government an emergency has arisen in which it is expedient for the public service that the Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether locally owned ships, British or foreign ships, in the waters of the Federated Malay States, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Chief Secretary to Government may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) No rules made in respect of the matters described in paragraphs (*c*), (*d*) and (*e*) of sub-section (1) shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Chief Secretary to Government that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted subject to such special terms, conditions, and restrictions as the Chief Secretary to Government may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Enactment or of any rule made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Enactment and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine not exceeding five hundred dollars.

(2) All convictions, forfeitures and fines under this Enactment or any rules made thereunder may be had and recovered before the Court of a Magistrate of the First Class.

SCHEDULE.

State.	No. and year.	Short title.
Perak ..	6 of 1905	The Telegraphs Enactment, 1905
Selangor ..	9 "	" "
Negri Sembilan	7 "	" "
Pahang ..	8 "	" "

RULES.

UNDER "THE WIRELESS TELEGRAPHY ENACTMENT, 1913."

By In exercise of the powers vested in him by section 6 of "The Wireless Telegraphy Enactment, 1913," the Chief Secretary to Government has made the following rules:—

1. All apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship, a British or a foreign ship, in the waters of the Federated Malay States shall be worked in such a way as not to interfere with (*a*) naval signalling or (*b*) the working of any wireless telegraph station lawfully established installed or worked in the Federated Malay States or the waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. (i.) No apparatus for wireless telegraphy on board a merchant ship, whether a locally owned ship, a British or a foreign ship, shall be worked or used whilst such ship is in any of the harbours of the Federated Malay States.

(ii.) To ensure the proper enforcement of paragraph (i.) of this rule—

(*a*) Locally owned ships and British ships in harbours of the Federated Malay States shall completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, in such a manner as to show that they are properly disconnected.

(*b*) Foreign ships in harbours of the Federated Malay States shall take down their aerial wires completely and disconnect the same from their radiotelegraph apparatus; provided that foreign ships remaining in a harbour of the Federated Malay States for less than twelve hours may, at the discretion of the Harbour Master or other competent local authority, be permitted to leave their aerials up, if the same are disconnected in the manner described in the last preceding clause;

(*c*) The operating room of any locally owned or British or foreign ship shall, in any case where the Harbour Master or other competent local authority so directs, be sealed up and kept sealed up while such ship is in a harbour of the Federated Malay States, and such other steps may be taken as to the Harbour Master or other competent local authority seem expedient.

3. If at any time, in the opinion of the Chief Secretary to Government, an emergency has arisen in which it is expedient for the public service that the Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships, whether locally owned ships, British or foreign ships, while in the waters of the Federated Malay States shall be subject to such further rules as may be made by the Chief Secretary to Government from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These rules shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. Expressions defined in "The Wireless Telegraphy Enactment, 1913," have in these rules the meanings thereby assigned to them.

(2) Non-Federated States.

These comprise Johore, Kedah, Perlis, Kelantan and Trengganu. The relations of Johore with Great Britain are defined in the Treaty of 1885,

amended by an agreement dated May 12th, 1914, whereby the Sultan exacts and acts upon the advice of a British officer called his General Adviser. With regard to the other four states, rights of suzerainty, administration and control were transferred by Siam to Great Britain under a Treaty dated March 10th, 1909.

At present there are no wireless stations in these States and consequently no radiotelegraphic enactments.

MALTA

THIS island, 17½ miles long by 8½ miles broad, forms the headquarters of the British Mediterranean Fleet and the principal coaling station for merchant vessels, as well as the Navy, in the Mediterranean. The language of the people is a corrupt dialect of Arabic. The Knights of St. John, who possessed the island from 1530 to 1798, raised the stupendous fortifications which rendered Malta so long militarily formidable. The island was finally recognised as a British dependency by the Congress of Vienna in 1814, and is ruled by a Governor, assisted by an Executive Council and a "Council of Government," the latest Constitutional amendment being dated December 30th, 1909.

ADMINISTRATION.

The administration of wireless telegraphy in Malta and its dependencies is under Naval control. There are two stations, one open for public service to ships and the other for Government traffic only, but no further particulars are as yet available. All that it is possible to do here is to print Section 28 of the Malta Defence Regulations, which deals specifically with radiotelegraphy.

SECTION 28, MALTA DEFENCE REGULATIONS.

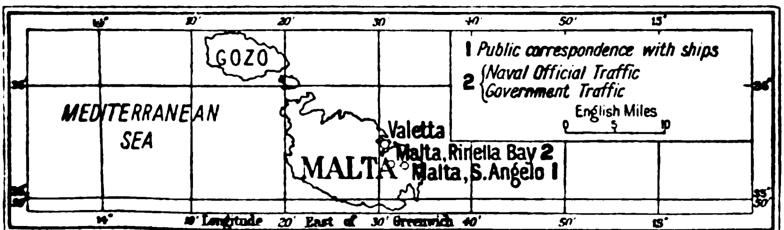
PROHIBITION AGAINST POSSESSION OF WIRELESS TELEGRAPHIC APPARATUS, ETC.

No person shall, without the written permission of the Governor, make, buy, sell, or have in his possession or under his control any apparatus for the sending or receiving of messages by wireless telegraphy, or any apparatus intended to be used as a component part of such apparatus ; and no person shall sell or give any such apparatus to any person who has not obtained such permission as aforesaid, and any person having in his possession or under his control any such apparatus, whether with or without the permission of the Governor, shall on demand deliver the apparatus to the Governor, or as he may direct ; and if any person contravenes the provisions of this regulation he shall be guilty of an offence against these regulations.

Where it appears to the Governor that there are reasons to suspect that any person having in his possession any apparatus for sending or receiving messages by telegraphy, wireless telegraphy telephony or other electrical or mechanical means is using or about to use the same for any purpose prejudicial to the public safety or the defence of these islands, he may, by order, prohibit that person from having any such apparatus in his possession, and may take such steps as are necessary for enforcing the order, and if that person subsequently has in his possession any apparatus in contravention of the order, he shall be guilty of an offence against these regulations.

For the purpose of this regulation, any apparatus ordinarily used as a distinctive component part of apparatus for the sending or receiving of messages by wireless telegraphy shall be deemed to be intended to be so used unless the contrary is proved.

Any person possessing private telephone installations or any apparatus capable of being used for transmitting telephone messages shall give notice to the Superintendent of Police of any such installation or apparatus, and if he fails to do so he shall be guilty of a summary offence against these regulations.



MARSHALL ISLANDS

(See map on p. 334.)

MARTINIQUE

(See FRANCE.)

MAURITIUS

MAURITIUS lies in the Indian Ocean, 500 miles east of Madagascar, and comprises a total area of about 720 square miles. It possesses but one wireless installation, and that is open to public service with ships.

The Colony was formally ceded to Great Britain by the Treaty of Paris of 1814. Under letters patent of 1885, 1901, 1904, and 1912 partially representative institutions have been granted. The Administration of the Colony and its dependencies is vested in a Governor, assisted by an Executive Council and a Council of Government.

ADMINISTRATION.

The legislation affecting Wireless Telegraphy in Mauritius was originated by an Ordinance (No. 33) issued in 1903 investing the Governor with certain administrative powers. This was amended by the "Wireless Telegraphy" (Amendment) Ordinance (No. 25) of 1912. These have since been consolidated by Ordinance No. 11 of 1913, and two sets of Regulations have been framed thereunder, as follows :—

A—Ordinance No. 11 of August 22nd, 1913 (to Consolidate the Laws on Wireless Telegraphy).

B—Regulations framed under Ordinance No. 11 of 1913 (Art. 4) (August 22nd, 1913).

C—Regulations framed by the Governor under Art. 4 (2) of the Ordinance No. 11 of 1913 (September 1st, 1917).

ORDINANCE No. 11.
August 22nd, 1913.

A BE IT ENACTED by the Governor, with the advice and consent of the Council of Government, as follows :—

1. *Definition of "Wireless Telegraphy."*—In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

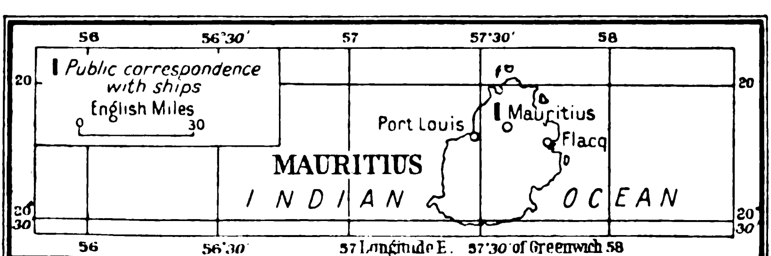
2. *Licence for "Wireless Telegraphy."*—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

3. *Apparatus aboard ships.*—A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this Ordinance.

4. *Regulations.*—(1) The Governor in Executive Council may from time to time make regulations for carrying into effect the purposes of this Ordinance.

(2) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His



Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

5. *Search Warrant.*—If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance he may grant a search warrant to any police officer or any person appointed in that behalf by the Inspector General of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. *Penalties.*—Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable to a fine not exceeding five hundred rupees (Rs. 500) and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

7. *Repeal clause.*—Ordinances Nos. 33 of 1903 and 25 of 1912 are repealed.

8. *Short Title.*—This Ordinance may be cited as "The Wireless Telegraphy (Amendment) Ordinance, 1913."

Passed in Council at Port Louis, Island of Mauritius, this twenty-ninth day of July, One thousand nine hundred and thirteen.

B REGULATIONS FRAMED UNDER THE WIRELESS TELEGRAPHY ORDINANCE No. 11 OF 1913 (ARTICLE 4).

1. Apparatus for wireless telegraphy on board a merchant ship shall not be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

2. Apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall not be worked in such a way as to interfere with

(*a*) Naval signalling, or

(*b*) The working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

3. In these regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval station and any other wireless telegraph station whether on shore or on any ship.

4. For the purpose of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. Any person who shall offend against any of these Regulations shall be liable to a fine not exceeding five hundred rupees (Rs. 500), and any apparatus for wireless telegraphy in connection with which the offence was committed may be seized and forfeited.

8. The Regulations published under Government Notification No. 19 of January 25th, 1913, are hereby repealed.

Made by His Excellency the Governor in Executive Council at a meeting held on August 22nd, 1913.

C REGULATIONS FRAMED BY THE GOVERNOR UNDER ARTICLE 4 (2) OF THE WIRELESS TELEGRAPHY ORDINANCE No. 11 OF 1913.

September 1st, 1917.

1. The radiotelegraph stations on merchant ships (whether British or foreign) shall not be worked whilst such ships are within the territorial waters of the Colony.

2. For the proper enforcement of the above, merchant ships of British register in the territorial waters of the Colony must completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, in such a manner as to show they are properly disconnected.

3. Merchant ships of foreign register in the territorial waters of the Colony must—subject to the provisions of Article 4—take down their aerial wires completely and disconnect the same from their radiotelegraph apparatus.

4. Merchant ships of foreign register remaining in the territorial waters of the Colony for less than twelve hours may, at the discretion of the Governor, be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of Article 2.

5. The radiotelegraph cabin on board merchant ships of British or foreign register shall be sealed whilst such ships are within the territorial waters of the Colony.

6. Any person who shall offend against any of these Regulations shall be liable to a fine not exceeding five hundred rupees (Rs. 500), and any radiotelegraph apparatus in connection with which the offence was committed may be seized and forfeited.

7. For the purpose of any proceedings under these Regulations, the Master or person being or appearing to be in command or charge of any merchant ship shall be responsible for the observance of these Regulations.

8. Any summons or other document in any

proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

9. It shall be lawful for the Governor on good cause shown to exempt any merchant ship, whether British or foreign, from the operation of these Regulations, for any period that may be fixed.

10. During the continuance of the present hostilities the above Regulations shall supersede the Regulations published under Government Notification No. 165 of August 22nd, 1913.

Approved by the Governor in Executive Council at a meeting held on the twenty-fourth day of August, 1917.

MEXICO

OCCUPYING an important position in the southern part of the Continent of North America. With an extensive seaboard both on the Atlantic and Pacific Oceans Mexico stretches from 15° 0′ to 32° 30′ N. latitude, and lies between 87° 0′ and 117° 0′ W. longitude. It covers an area of 768,883 square miles, and comprises 27 States and three Territories, besides the Federal District of Mexico.

CONTROL.

The National Radiotelegraphic Service is controlled by the Director-General of National Telegraphs, whose officials constitute the Executive in all matters referring thereto. The Radiotelegraphic Service is actually in charge of the Technical Department of the Director-General himself.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Sr. M. Mendez	Director-General of National Telegraphs ..	Mexico City

ORGANISATION.

Forms of licences for erection of stations and for operators will be annexed to the Law in the course of being codified. The radiotelegraphic stations open for public service to ships are fourteen in number, in addition to which we may include the installation which was recently completed at the Port of Salina Cruz.

There are at present no radiotelegraphic arrangements for the assistance of aviation, nor do the *National* Stations maintain any service for Time or Weather Signals.

ADMINISTRATION.

A National Radiotelegraphic Law is in course of being drawn up, and it is hoped it will come into force during 1920. The only extant decree relative to radiotelegraphy runs as follows :—

A—Decree of October 19th, 1916.

ART. I.—The establishment and exploitation of Radiotelegraphic Stations is forbidden in the Mexican Republic except under the express authorisation of the Federal Government, which can only accord it on the terms and under the conditions which are contained in the Regulations attached to the said Law.

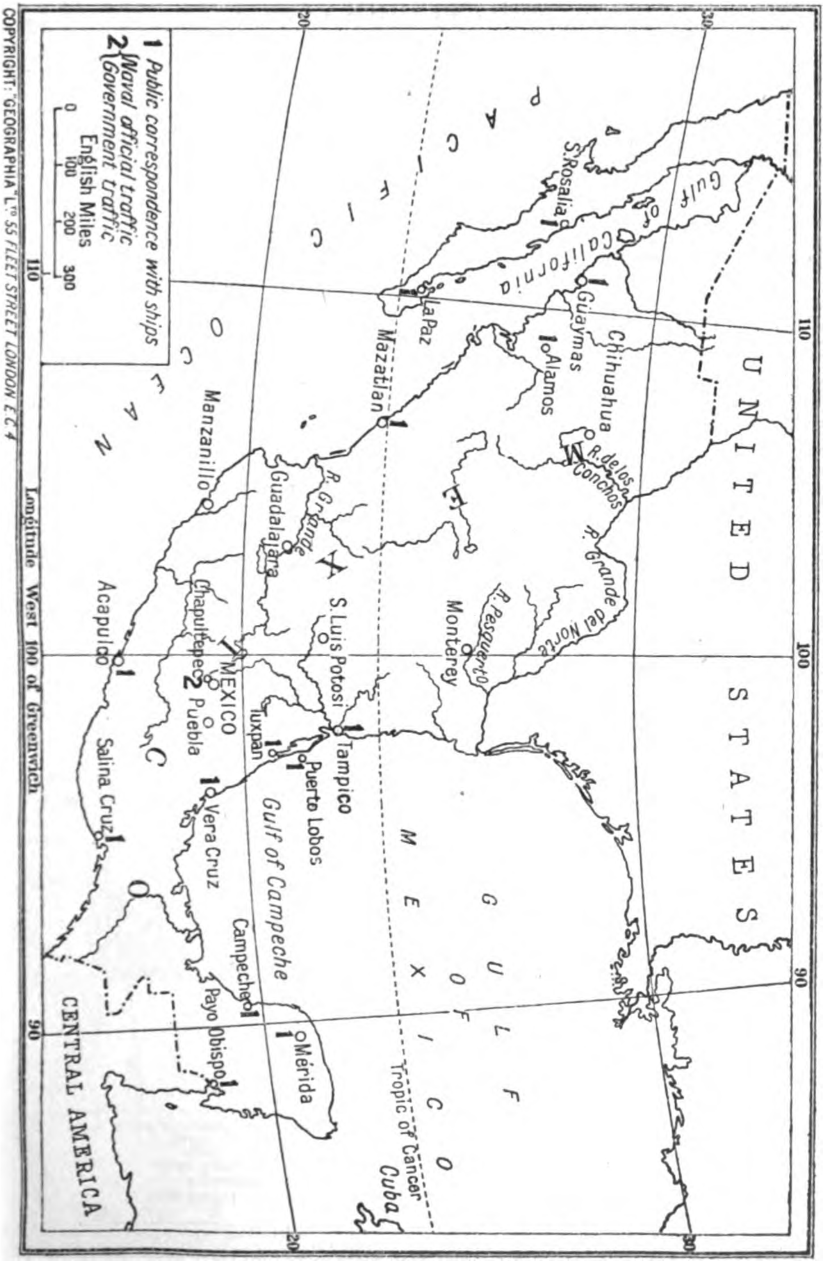
ART. II.—Anyone who without the authorisation of the Federal Government establishes a Radiotelegraphic Station shall be liable to a penalty of 500-1,000 pesos, or imprisonment from 1 to 11 months, or shall suffer a combination of both penalties in accordance with the seriousness of the offence. Moreover, all apparatus, machines, and accessories forming part of the installation shall be sequestrated for the benefit of the State.

ART. III.—If any corporation which instals a Radiotelegraphic Station be a company or any other responsible body, direct responsibility with regard to the infraction of this law is vested in the person of the directors, agents or administrators.

ART. IV.—Any persons who make use of a Radiotelegraphic Station installed without the authorisation of the Federal Government shall be liable to a punishment of half the penalty enacted in ART. II. preceding.

ART. V.—Any persons who make use of a Radiotelegraphic Station without the authorisation of the Federal Government, or who intercept a communication between Public Departments, or who divulge its contents, shall be liable to the penalty which is contained in ART. 770 of the Penal Code of the Federal District.

ART. VI.—This Law enters into operation from the date of its publication.


1 Public correspondence with ships
2 {Naval official traffic / Government traffic
English Miles
0 100 200 300
COPYRIGHT: "GEOGRAPHIA" L^TD 55 FLEET STREET LONDON E.C.4
Longitude West 100 of Greenwich
UNITED STATES
CENTRAL AMERICA
MEXICO
PACIFIC OCEAN
GULF OF MEXICO
Gulf of California
Gulf of Campeche
Tropic of Cancer
Cuba
S.Rosalia
LaPaz
Guaymas
Chihuahua
Alamos
Mazatlan
R. de los Conchos
R. Grande del Norte
R. Pesquerto
Monterey
R. Grande
Guadalajara
Manzanillo
S. Luis Potosi
Tampico
Tuxpan
Puerto Lobos
Chapultepec
Puebla
Acapulco
Vera Cruz
Salina Cruz
Campeche
Mérida
Payo Obispo

MONTSERRAT

(See Leeward Islands.)

MOROCCO

KNOWN to the natives as "Maghreb-el-Aksa" (the farthest west), Morocco is an empire sometimes spoken of as the Mauritanian Quadrilateral. It lies in North-West Africa between Algeria on the east and the Atlantic Ocean on the west, and is bounded on the north by the Mediterranean and on the south by the Sahara Desert. The language of the country is a dialect of Arabic, and the majority of its inhabitants are Moslems. By the Conference of Algeciras, held in 1906, France and Spain agreed to organise the police force and customs of the coast towns, whilst the internal government of the country lies mainly in the hands of the Sultan and his advisers.

(a) French Zone.

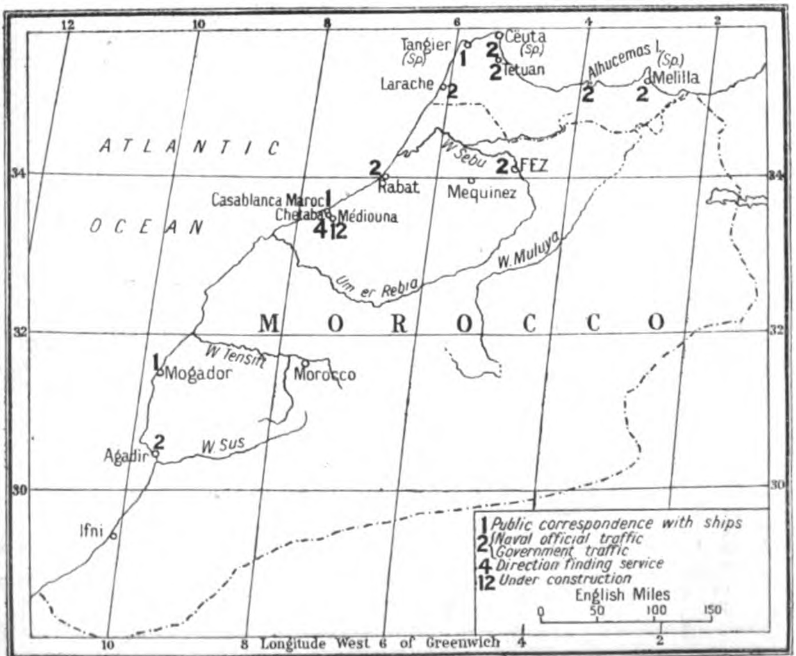
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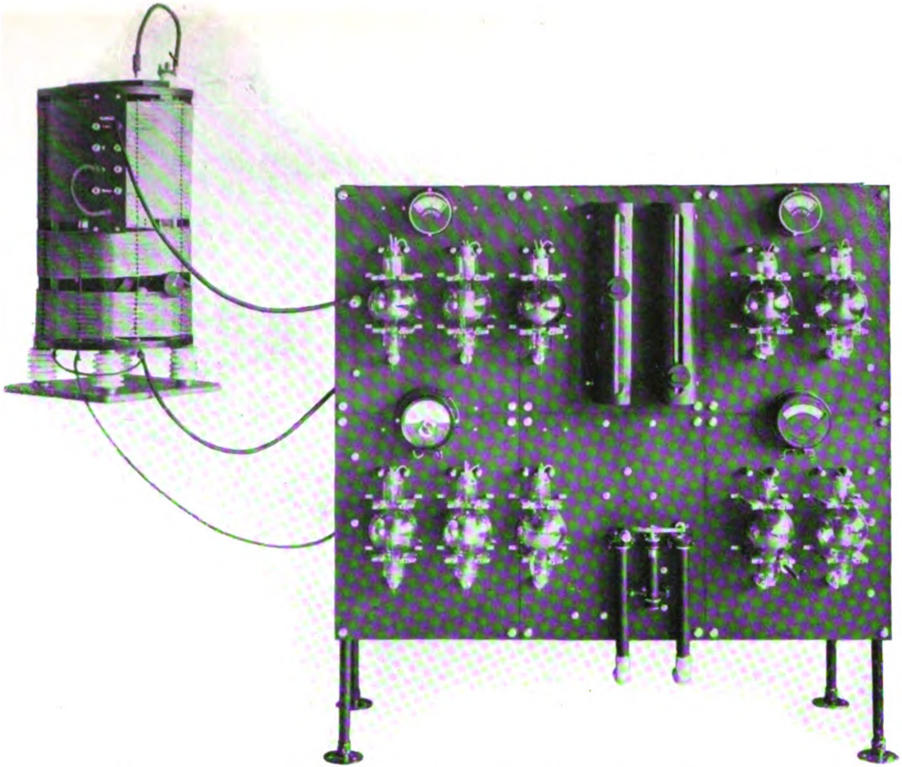
The question of establishing wireless telegraph stations in Morocco first arose in 1906, when the Shereefian Government decided to create several stations. A company was formed at Tangier, called the Société Internationale de la Télégraphie Sans Fil, which received the concession to instal the service. Its director was M. Henri Popp, a French engineer. The company did not exist long, however, for in 1908 the Shereefian Government bought it out, M. Popp remaining as manager and chief engineer.

ORGANISATION.

The first stations to be established were Tangier and Casablanca, in 1907. Next came Rabat, in 1908, and Mogador at the end of the same year.

In 1910 M. Popp died, and was succeeded by M. Biarnay, under whose





MARCONI 6 K.W. C.W. TRANSMITTING PANEL SHOWING AERIAL TUNING INDUCTANCE.

[To face page 304

direction the Fez station was established during the summer and autumn of 1911. Since then the Shereefian Government has created no further stations. The French Military Authorities, however, have stations all over the French Zone, including one at Agadir. Transportable military wireless telegraphy installations have been in use by French mobile columns since 1911.

The present organisation consists of the Shereefian Government stations at Tangier, Casablanca, Mogador, Rabat, and Fez. Of these the first three only are for public use, the stations at Fez and Rabat being solely for military use. The wireless telegraph service is under the direction of M. Walter, Directeur de l'Office des Postes et des Télégraphes du Maroc, Résidence Générale, Rabat. Wireless telegraphy in the French Zone forms a Government monopoly.

ADMINISTRATION.

Military wireless telegraph stations keep headquarters at Rabat informed as regards meteorological conditions for the use of the Military Aeronautical Bureau.

The current Laws and Regulations governing wireless telegraphy consist of the Radiotelegraphic Convention of London, 1912. No licences have as yet been granted to members of the public. Legislation on this point, it may be surmised, will take place before long.

Regulations affecting aviation in relation to wireless telegraphy, and arrangements for despatching time, weather, and meteorological information have not yet come into existence.

(*b*) SPANISH ZONE.

ORGANISATION.

The first wireless telegraph station installed in the Spanish Zone was that of Melilla (call letters EGB), erected in July 1918.

At the present time there are in existence the following stations: Melilla (EGB), erected in July 1918 in charge of Captain of Engineers Don Juan Reig Valerino; Ceuta and Tetuan (EGD and EGK respectively), put up in July 1911 and July 1914, in charge of Captain of Engineers Don Monserrat Fenech Munoz, Diploma of the Staff, assisted by Lieutenant of Engineers, Don Antonio Guerindiain Ponte; Larache (EGF), in charge of Captain of Engineers Don Jesus Prieto Rincon, put up in December 1911, and Alhucemas,

These are the only permanent wireless stations in the Spanish Zone. They are all under the jurisdiction of the Ministry of War, and are controlled by the Centro Electro-tecnico y de Comunicaciones (Engineers).

ADMINISTRATION.

Existing arrangements as regards meteorological information are the same as those for Spanish Stations, the Madrid Station being in charge of this service.

The regulations governing these stations are the same as for Spain, and licences are given by the Centro Electro-tecnico y de Comunicaciones after the necessary examinations.

NETHERLANDS (THE)

THE Netherlands is the official name of the Kingdom of Holland, and possesses the same signification as its old English title of the "Low Countries." During the fourteenth century the Countship of Holland and Earldom of Flanders became appanages of the Dukes of Burgundy, and through them passed under Spanish rule; which, tyrannically exercised, ended in the establishment of the Netherlands Republic. At the close of the seventeenth century the Stadtholdership was revived for a time in the person of William, Prince of Orange, who became King of England. The Batavian Republic (a combination of Holland and Belgium) was established by the French at the end of the eighteenth century, and this was later con-

verted into a kingdom under Louis Bonaparte. The Orange family was recalled after Napoleon's fall; but Belgium seceded from the "United Kingdom" in 1830. The present Queen Wilhelmina is a scion of the House of Orange.

The eleven provinces into which Holland is divided lie between 50° 46′ and 53° 34′ N. latitude, extending from 3° 22′ to 7° 14′ E. longitude. They cover a total area of 12,761 square miles. Holland is a constitutional monarchy, the executive being vested in the King or Queen (acting through the Ministers), and the power to make laws in the King or Queen with Parliament ("Staten Generaal"). The Parliament consists of two chambers, of which the second is directly elected by the people and the first by the "Provinciale Staten." The chief commercial cities are Amsterdam and Rotterdam, the court capital and centre of administration being located at The Hague (Den Haag).

CONTROL.

The administration of radiotelegraphy, except so far as the Navy, the Army, and the Colonies are concerned, is placed in the hands of the Director-General of Posts and Telegraphs under the supervision of the Minister of Waterways.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Minister A. A. H. W. König	Minister of Waterways ..	Zyne Excellentie den Minister van Waterstaat te 's Gravenhage
Mr. E. P. Westerveld ..	Director-General of Posts and Telegraphs	Den Heer Directeur Generaal der Posteryen en Telegrafie te 's Gravenhage
Mr. A. E. R. Collette.. ..	Chief Engineer, Director of Telegraphs	Den Heer Hoofdingenieur Directeur der Telegrafie te 's Gravenhage
Mr. H. J. Nierstrasz	Inspector of Coast and Ship Radiotelegraph Service	Den Heer Inspecteur bij den Rusten sheeps Dienst der Radiotelegrafie Scheveningen-Haven

ORGANISATION.

Radiotelegraphy has from its initiation in practice attracted much interest in Holland. As early as 1899 a commission (Messrs. B. J. R. Engelbregt, C. J. de Vriese, J. C. Ramaer, and Dr. L. Bleekrode) was appointed to report on the subject of the possibility of wireless communication between the lightship *Maas* and the *Hook of Holland* (16 km.). In the beginning of 1902 this communication was sufficiently ascertained. In the same year wireless traffic was established between the railway stations Enkhuizen and Stavoren on behalf of the ferry steamer between the two places.

In February, 1904 (see page 536, YEAR-BOOK, 1913), a Marconi station was opened at Amsterdam for the transmission with Broomfield in Essex of Press messages and stock quotations. The messages were published in the newspaper *Het Handelsblad*. The correspondence was of private nature, and ceased after some time.

In September, 1904, the Government station, Scheveningen Port (North Sea coast, near The Hague), was opened for general public correspondence with ships at sea. Scheveningen was the first Government coast station of that nature in Europe.

Holland was one of the signatories of the first International Radiotelegraphic Convention (Berlin, 1906). Its plenipotentiaries were Messrs. A. Kruyt, J. J. Perk, and H. T. Hoven, whilst adjoined to them were Messrs. H. J. Nierstrasz, M. F. Onnen, and G. J. W. Puttmann Cramer.

Dutch radiotelegraphy has expanded in all directions. The Government recently ordered the building of a power station, destined for direct communication with the Dutch East Indies.

Land Stations (Netherlands).

According to the Latest Available Statistics.

Government traffic only	4
Under construction	1
Government station open for public service	1
Stations with public restricted service	5

Moreover, there are a large number of amateur stations only suitable for reception.

Ship Stations (Netherlands).

According to the Latest Available Statistics.

Stations worked by private enterprise open for public service	101
Government stations open for public service	2
Navy stations	24
Special stations on board lightships	5

Land Stations (Dutch East Indies).

According to the Latest Available Statistics.

Stations for public correspondence with ships ...	5
Stations for restricted public correspondence with ships	2
Stations under construction	1

Land Stations (Curaçao).

Public correspondence with ships	3

So far as land stations are concerned, public wireless telegraphy is a State monopoly. A permit has been granted for the working of some stations on board river boats of the police at Rotterdam. Other private stations have been allowed for scientific purposes only. For the reception of signals, however, a permit is not necessary.

Stations on ships at sea may not be established or worked by private enterprise without a licence issued by the Queen. The general conditions which are imposed are laid down in the form given below (E).

ADMINISTRATION.

The regulation of radiotelegraphy was first instituted by including a clause relating to wireless in the Telegraph and Telephone Act of 1904. This Act has been supplemented and amended, as far as radiotelegraphy and telephony are concerned, by the Act of March 21st, 1919. This Act, which became effective on November 15th, 1919, also includes the regulations concerning radio stations not destined for general public service, which hitherto were fixed in the Royal Decree of March 6th, 1905. It includes, furthermore, provisions for the use of stations on vessels of foreign nationality within territorial waters and in waters within the territory of the kingdom,

as well as for the acknowledgment of foreign licenses (Art. 9, Radiotelegraph Convention of London). On May 10th, 1906, a further Royal Decree fixed a Provisional Tariff for the Telegraphic Communication of Wireless Reports and Distress Signals from ships at sea. The text of the Telegraph and Telephone Act and the above-mentioned Decree will be found below, so far as they appertain to radiotelegraphy.

In 1919 Parliament passed the Bill (presented by the Minister of Agriculture, Industries and Commerce in 1916) to give effect to the International Convention for the Safety of Life at Sea. This Act (Shipping Convention Act of April 5th, 1919) is in agreement with the Articles of the Convention, but has only just come into force.

The prohibitions issued by the War Minister at the outbreak of the war regarding the use of radiotelegraph installations were cancelled at the close of 1918.

The Netherlands possesses important colonies in the East Indies, as well as in South America, and the wireless laws and regulations current in those colonies are appended in the following pages.

The text (so far as radiotelegraphy is concerned) of the following enactments figure below :—

A—Telegraph and Telephone Act, 1904 (supplemented and amended by the Act of March 21st, 1919).

B—Royal Decree of the 10th May, 1906.

C—Regulation for Colony of Curaçao.

D—Regulation for Dutch East Indies.

E—Form of Licence for Ship Stations.

F—Prescriptions issued by the Minister of Waterways regarding the working of foreign vessels within territorial waters or on waters within the territory of the kingdom.

TELEGRAPH AND TELEPHONE ACT OF 1904.

A The Telegraph and Telephone Act of 1904 mainly refers to the ordinary wired services, and it has not been judged worth while, therefore, to reprint it in full here.

According to Article II of this Act, a licence granted by the Queen is necessary before telegraphs and telephones can be established or worked by private enterprise. The Act also contains the terms under which the licence is issued and the conditions binding on the licensee.

The above provision is also applicable to wireless telegraphy.

Article III prescribes that for the establishment and the use of radiotelegraph and telephone stations not destined for general public service an authorisation from the Minister of Waterways is required.*

Art. IIIa.—It is forbidden to work radiotelegraphs and telephones, be they destined for public service or not, on board vessels other than of Dutch nationality when within territorial waters, or in waters within the territory of the kingdom, unless it be done in accordance with the prescriptions fixed by the Minister of Waterways (see "F.").

For the radiotelegraphs and telephones referred to in the first part of this Article neither licence nor authorisation is required, unless they are within the territorial waters of the kingdom and without the licence required in virtue of the International Telegraph Convention (with Regulations) of London such as it is at present constituted (Staatsblad 1913, No. 132) or may be constituted, also as it may be modified for the Netherlands.

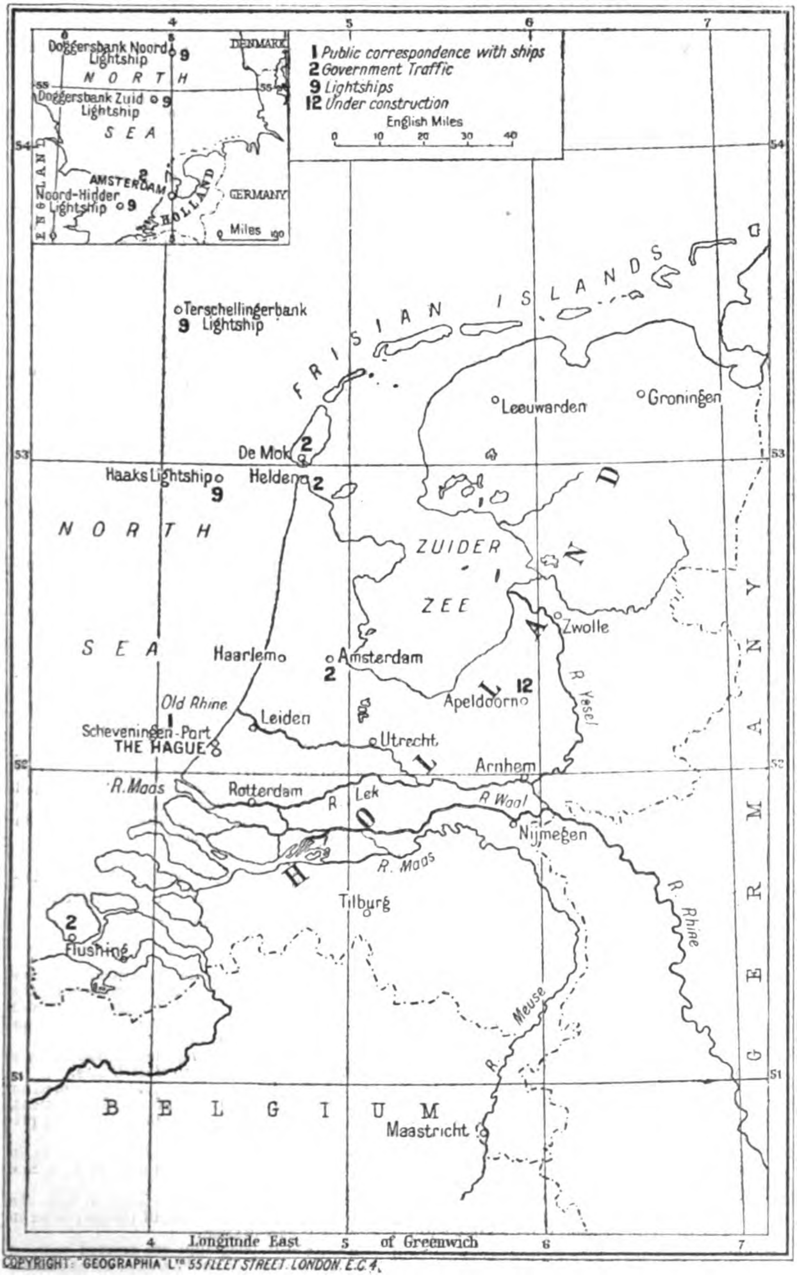
* Note.—Stations only suitable for the reception of radiotelegraphic signals are not considered as radiotelegraph and telephone stations.

B Decree of May 10th, 1906, relating to the fixing of provisional tariff for telegraphic communications for reports and distress signals received by radiotelegraphic means from ships at sea.

Art. 1.—The Government Office with radiotelegraphic service at Scheveningen Harbour shall report by telegraph, to those who have notified themselves for the purpose, the communications from ships and distress signals received by way of radiotelegraphy.

Art. 2.—The reports referred to in Article 1 shall be supplied within the Netherlands subject to the payment by the addressee of a coast charge of 1 florin for the present for each communication, increased by an amount of 50 cents if the telegram to be drawn up does not contain more than 10 words, and of 25 cents above this for each successive 10 words or fraction thereof.

Nevertheless, the reports herein mentioned may also be supplied against such a fixed price per year as shall be fixed by our Minister of Waterways, Commerce and Industry for each interested party, taking into consideration both the number and the extent of the required information and also the above-named tariff.



1 Public correspondence with ships
2 Government Traffic
9 Lightships
12 Under construction
English Miles
Doggersbank Noord Lightship
Doggersbank Zuid Lightship
NORTH SEA
AMSTERDAM
Noord-Hinder Lightship
HOLLAND
GERMANY
DENMARK
Miles
Terschellingerbank Lightship
FRISIAN ISLANDS
Leeuwarden
Groningen
De Mok
Haaks Lightship
Helder
NORTH SEA
ZUIDER ZEE
Zwolle
Haarlem
Amsterdam
Apeldoorn
Old Rhine
Leiden
Utrecht
Scheveningen-Port
THE HAGUE
Arnhem
R. Maas
Rotterdam
R. Lek
R. Waal
Nijmegen
R. Maas
Tilburg
Flushing
R. Yssel
R. Rhine
R. Meuse
BELGIUM
Maastricht
GERMANY
HOLLAND
Longitude East of Greenwich

In supplying the reports referred to in this Article to interested parties outside the Netherlands, the above-mentioned costs will be increased by the foreign telegraphic tariff applying thereto.

ART. 3.—This Decree shall come into operation on the second day after the date of the *Staatsblad* and the *Staatscourant* in which it is published.

Our Minister of Waterways, Commerce and Industry is entrusted with the execution of this Decree, which shall be published simultaneously in the *Staatsblad* and in the *Staatscourant*, and a copy whereof shall be sent to the State Council.

REGULATIONS FOR TELEGRAPHIC SERVICE IN THE DUTCH COLONY OF CURACAO.

(See map on p. 295.)

Publication No. 52 of 1909. (21st September.)

C The Governor of Curaçao, in view of the desirability of replacing by new regulations the decree of the 30th October, 1873, regulating the inland and foreign telegraph communication of the colony as well as that of the 27th September, 1884, regulating telephonic communication, and having received the sanction of the Colonial Council, has determined on the following decree :—

ART. 1.—In this decree it is understood that telegraphs and telephones refer to the usual line-telegraphs and telephones as well as to radiotelegraphs and telephones.

ART. 2.—No telegraphs and telephones may be installed on any of the islands of the colony by others than the Government, unless a special permit is granted. Besides the special conditions, made in each case, the general rules are :—

(*a*) The erection, maintenance and exploitation should be carried out to the satisfaction of the Governor.

(*b*) The tariffs, conditions of use and service regulations must be submitted for the approval of the Governor.

(*c*) The concession may be granted absolutely or conditionally, but for no longer period than 25 years.

(*d*) The concession may be withdrawn by the Governor if the above rules or the special conditions are not followed.

ART. 3.—It is forbidden, without the permission of the Governor, to use radio-telegraphs or telephones, fitted on board foreign or private-owned Dutch ships, in the ports or anchorages of the colony, unless in special circumstances, the exigencies of good seamanship render it necessary to do so.

ART. 4.—Everybody may make use of telegraphs and telephones under the existing regulations. The transmission of telegrams or the conversation by telephone may be stopped or refused if in conflict with the safety of the colony, public order, or common decency.

The reasons for refusal or stoppage should be communicated to the party concerned.

The decision of the Governor may be invoked in such cases.

ART. 5.—For the public interest the Governor may put telegraph and telephone service under control or partially suspend it for an indefinite period.

ART. 6.—In case of war, or if any of the islands of the colony be placed under martial law, if so desired the telegraphs and telephones may be put under Government control.

ART. 7.—Imprisonment of one day to six months and fines from 10 florins to 1,000 florins conjointly or separately will be inflicted on those who erect or exploit telegraphs and telephones, without the permission required as specified in Art. 2 ; or who on board private-owned ships, make unlawful use of the same (Art. 3).

The instruments may, in so far as they are owned by the guilty parties, be confiscated.

ART. 8.—Anyone who wilfully damages or destroys telegraph and telephone works, including cables, in use for public benefit, will be punished with imprisonment from three months to three years.

Anyone who causes such damage as is referred to above, through neglect, may be punished with imprisonment of one day to one month or a fine of 1 florin to 100 florins.

ART. 9.—Deals with the punishment of crimes committed in which telephones are used.

ART. 10.—Libellous, offensive and indecent expressions used over the telephone, will be considered as uttered in public.

ART. 11.—Violation of the secrecy of telegraphs and telephones is punishable in accordance with Arts. 137 and 327 of the existing law.

ART. 12.—Owners of property have to allow, if it is necessary, work to be done on it in connection with the erection of public telegraphs.

ARTS. 13, 14, 15 and 16 deal with the use of private property in the erection of telegraph and telephone lines.

ART. 17.—All precautions should be taken to prevent lightning being conducted along cables or lines.

ART. 18.—The above may be referred to as "Telegraaf- en Telefoon-Verordening 1909," adding the number of the publication.

ART. 19.—Decrees of 30th October, 1873 (P.B. 1874, No. 1) and of 27th September, 1884 (P.B. 1884, No. 14) as well as P.B. 1892 No. 27 are withdrawn.

ART. 20.—Concessions relating to the erection of telegraphs and telephones on any of the islands of the Colony of Curaçao, granted before this decree comes into force, will be treated as coming under the regulations in force when they were made.

REGULATIONS FOR TELEGRAPH SERVICE IN THE DUTCH EAST INDIES.

6th October, 1876.

(See map on p. 120.)

D The old regulations issued by decree of 31st March, 1858, concerning the electro-magnetic telegraphs should now be superseded and new regulations as hereunder be brought into force.

Regulations concerning the erection and use of telegraphs in the Dutch East Indies.

ART. 1.—No telegraphs may be erected or used without permission of the Government, except those exclusively owned and used privately.

ART. 2.—The conditions for permission to erect such telegraphs will be fixed in each case separately.

ART. 3.—The Governor-General has the right to take possession of all telegraphs or to stop their exploitation.

ART. 4.—If telegraphs are erected without permission open for public traffic, a fine of from 200 florins to 1,000 florins can be inflicted.

Art. 5.—Owners of property have to allow, if it is necessary, work to be done on it in connection with the erection of public telegraphs.

Art. 6.—They should give access to officials and not interfere with the work done and the lines erected.

Art. 7.—If they refuse access they will be fined from 25 florins to 100 florins.

Art. 8.—They have a right to compensation for damage done to their property.

Art. 9.—Everybody has a right to have telegrams sent under the conditions laid down in the service regulations.

Art. 10.—The State or the Telegraph Company is not responsible for the transmission of telegrams in general or within a certain time.

Art. 11.—Punishment for embezzlement or opening of telegrams, communication of their contents to outsiders, etc., will be inflicted in accordance with the existing laws.

Art. 11*a*.—Telegrams the contents of which are of danger to the State, or in conflict with the law, or of an obscene character, will not be accepted or delivered.

Art. 12.—Punishment in accordance with the existing laws is to be inflicted on every official who falsifies telegrams and on those who knowingly profit by the misuse of such telegrams.

Art. 13.—Damage to telegraph works or material is punishable with imprisonment and penal servitude.

Art. 14.—The Head of the Local Council may order, on request of the Chief of the Telegraph Service, the removal of everything impeding the efficiency of that service.

The above was published in the *Official Gazette* (*Staatsblad*) of the Dutch East Indies, and the regulations also apply to Telegraphs or Telephones, whereby the apparatus at both ends is not connected with wires or conductors (decree of 7th December, 1903. *Staatsblad* No. 405).

LICENCE FOR SHIP STATIONS.

Art. 1.—In this Licence is meant—

By Convention: the Radiotelegraphic Convention with final protocol, signed in London on July 5th, 1912, and all alterations and additions, that may be made thereto.

By Regulations: the Regulations belonging to this Convention with all alterations and additions that may be made thereto.

Art. 2.—The Licence is given for an indefinite period, and may be withdrawn at any time, after one year's notice.

The Licence, or an authentic copy of it, should always be kept on the ship. It must be shown on request abroad if asked for by the persons authorised herein.

Art. 3.—*System.*—The Licensee is obliged to choose a system capable of communication with the Government stations opened for public radiograms, and to make the installation comply with the International Laws and Regulations. The antenna input should be such as to enable a decrease down to 10 per cent. of the maximum input. If an emergency set is required, as set forth in Art. II. of the Regulations, the source of power, and eventually the other parts of the installation, must be fitted on or above the upper deck, and, furthermore, are subject to the rules to be made therefor by the Director-General of Posts and Telegraphs. In case the position of the wireless cabin does not give the telegraphist direct communication with the bridge, without leaving the operating room, direct communication must be established as may be required by the Director-General of Posts and Telegraphs.

Art. 4.

Hours of Service.

A. *First Class.*—On ship stations belonging to the first class, as stipulated in Art. 13, s. 3, of the Regulations, a continuous watch is kept. Except in cases of *force majeure* these rules should not be discarded without consent of the Director-General of Posts and Telegraphs.

B. *Second Class.*—On ship stations belonging to the second class, as stipulated in Art. 13, sec. 3, of the Regulations, a watch is kept during the hours indicated in the official list of radiotelegraphic stations. The hours of service are fixed in consultation with the Director-General of Posts and Telegraphs. Except in cases of *force majeure*, these rules should not be discarded without consent of the Director-General of Posts and Telegraphs.

C. *Third Class.*—Ship stations belonging to the third class are those indicated in Art. 13, sec. 3, of the Regulations.

Art. 5.

Information.

As for the station on shipboard the Licensee is obliged to provide the Director-General of Posts and Telegraphs with all facilities and information necessary for the fulfilment of all legal requirements.

Art. 6.

Approval of the ship station and its operators. No station on shipboard may be worked before the Director-General of Posts and Telegraphs has approved of the installation, as well as of the class and ability of the operators. A written document approving of the installation is handed over by the Director-General of Posts and Telegraphs, and should be hung up close to, or inside, the operating room. Any change made must be approved of in the same way.

Officers authorised by the said Director-General of Posts and Telegraphs must always be admitted for the purpose of testing whether the plant still fulfils the requirements. Any examination effected in this way is registered on the said document.

As a proof that the operators are competent, a certificate containing the name of the holder mentioning the class, is issued by the Director-General of Posts and Telegraphs. Moreover, it is stated thereon that the bearer is under an obligation to the said Director-General of Posts and Telegraphs of keeping secret any telegrams that might come to his knowledge by virtue of his position on board ship.

This certificate may be withdrawn if it is evident to the Director-General of Posts and Telegraphs that the holder no longer fulfils the requirements, or that he has failed to observe the conditions of this Licence.

Alterations to the installation of the ship station falling under any rule of the Convention or the Regulations, and changes in the method of working, must be at once reported to the said Director-General of Posts and Telegraphs.

Art. 7.

Authorisation to work Station.

The Licensee is authorised to exchange telegrams with stations opened to public correspondence, as well as with stations not destined for public wireless traffic, as far as this does not interfere with public correspondence; both authorisations hold good, subject to their not infringing any private rules which might be in force at any of these stations. All communication by a ship station must cease immediately upon the request of a Dutch coast station open to public correspondence.

ART. 8.
Wave-length.

In addition to the wave-length of 600 and 300 metres provided for in Art. 3 of these Regulations, other wave-lengths less than 600 metres are used in some cases according to the provisions made by the Director-General of Posts and Telegraphs.

ART. 9.
Places where Transmission is Prohibited.

Apart from the conditions of the Regulations appertaining thereto, it is hereby forbidden without the consent of the Director-General of Posts and Telegraphs, given with due regard to the relevant conditions, to use the ship stations within Dutch territorial waters or any Dutch waters inside those limits, unless under special conditions the requirements of good seamanship make contravention of this rule a necessity.

ART. 10.
Cessation of Traffic.

The working of a ship station is suspended either completely or partly as soon as it is judged necessary to the general interest. Upon the order of the Director-General of Posts and Telegraphs, the service may be suspended at certain places or daily during certain hours.

ART. 11.
Approval according to Art. 2 of the Telegraph and Telephone Act.

The remaining conditions concerning the use of the Service Regulations, and the rate of wages and hours of duty of the operators, are submitted for the approval of the Minister of Waterstaat.

ART. 12.
Exchange of Telegrams.

The conditions of the Dutch Telegraph and International Regulations, and further, the conditions concerning the public Dutch radio-telegraph service, as well as all modifications and supplements thereto, refer to the exchange of telegrams.

ART. 13.
Ship Tax.

The ship tax amounts to ....

ART. 14.
Accountancy.

The settlement of taxes takes place according to the rules to be fixed by the Director-General of Posts and Telegraphs.

ART. 15.
Secrecy of Correspondence.

The Licensee is obliged to observe secrecy in regard to all telegrams which might come to his knowledge by means of the ship station. He must make sure that no person other than the operator in charge of the station has any opportunity of learning the contents of said telegrams.

ART. 16.
Forwarding of Documents.

The forwarding of documents concerning the radiotelegraphic service must take place under the rules of the Director-General of Posts and Telegraphs made according to the restrictions mentioned in Art. 11 of the Regulations.

ART. 17.
Precautions.

The Licensee is obliged to take all precautions desired by the Minister of Waterstaat within the period fixed in the Licence.

ART. 18.
Control.

Officers appointed by the Director-General of Posts and Telegraphs are authorised to control the working of the station and its operators, and to supervise the station service generally. If required they may also take temporary control of the station, upon showing a written and signed authorisation.

ART. 19.
Distress Signals.

For sending or receiving distress signals it is allowed to depart from the conditions of this concession, provided this deviation is necessary for the benefit of the ship in distress. None other than the signal .... (which may also be given as a distress signal in cases of other accidents than those which may occur to the ship concerned), may be used in connection herewith, unless approved by the Director-General of Posts and Telegraphs.

ART. 20.
Meteorological Telegram, Time Signals, and other Signals.

The Licensee is obliged to adhere to the rules which are made by or on behalf of the Minister of Waterstaat with reference to meteorological telegrams, time signals, and other signals.

ART. 21.
Authorisations and Obligations Outside the Territorial Waters of the (Dutch) Kingdom.

Outside the territorial waters of the Kingdom the rules of this Licence are valid in so far as they are not contradictory to the Laws and Regulations which hold good in the locality in question.

ART. 22.
Other Rules and Regulations.

Moreover, the Licensee is subject to and henceforth obliged to adhere to all Regulations referring to radiotelegraphy which are prescribed or will be prescribed by Dutch law; by the Convention and the Regulations; or by any other International agreement to which Holland accedes or will accede; as well as to any modifications which may be deemed necessary for the execution of such Regulations.

ART. 23.
Withdrawal of Licence.

This Licence may be withdrawn—

1. If within a year no use is made of it.
2. By not adhering to the prescriptions of the Telegraph and Telephone Act of 1904 (Official Collection of Laws No. 7), under which prescriptions this Licence is granted, or by not adhering to any rule mentioned in the said national or international legal prescriptions.
3. If the ship mentioned at the beginning of this Licence ceases to be a Dutch ship.

ART. 24.
Further Obligations of the Licensee.

(*a*) The Licensee is under an obligation to give immediate notice to the Director-General of Posts and Telegraphs when an altered service Regulation in consequence of Art. 4, last paragraph, of this Licence is introduced, also when the ship on which the station has been fitted is out of commission or changes owners.

(*b*) The Licensee is under an obligation to give immediate notice to the Director-General of Posts and Telegraphs when an altered service Regulation in consequence of Art. 4, last paragraph, of this Licence is introduced; also when the ship on which the station has been fitted is out of commission or changes owners.

(*c*) The Licensee is under an obligation to give immediate notice to the Director-General of Posts and Telegraphs if the ship on which the station has been fitted is out of commission or changes owners.

ART. 25.
Violation of Rules.

In addition to the withdrawal of Licence mentioned in Art. 23, except in cases of *force majeure*, the Licensee is fined from F. 10 to F. 1,000, at the discretion of the Minister of Waterstaat, for each violation of any rule laid down in this Licence, of the said national or international legal prescriptions, as mentioned herein, and is fined from Fl. 1 to Fl. 100 for each day, after the period fixed for paying the fines, that he fails to adhere to the rules of this agreement.

Dating from the day on which the decision to withdraw the Licence in consequence of Art. 23 has been taken, fines are no longer due. This article may be applied immediately the said Minister decides the legal grounds for administering a fine ; or the legality of a claim on grounds of *force majeure*.

In addition to the fine, the said Minister will decide to what cause the violation is due, to enable him to take action according to the contents of Art. 12 of these Regulations.

ART. 26.
Acceptance.

A declaration of agreement must be forwarded to the Director-General of Posts and Telegraphs, within the period fixed by him, intimating an acceptance of the terms of this Licence.

PRESCRIPTION ISSUED BY THE MINISTER OF WATERWAYS.

FRegulations which are prescribed by the Minister of Waterways and which in as far as they do not differ from any international agreement, to which the Netherlands are, or will be bound, are valid for foreign radiotelegraphic or telephonic ship stations which are within territorial waters or in waters within the territory of the Kingdom.

ART. 1.—1. It is forbidden to use radiotelegraphs or telephones be they destined for public service or not, installed on board of foreign ships within Dutch territorial waters or waters within the territory of the Kingdom, unless the prescriptions of this disposition are observed.

2. Moreover shall, as far as waters within the territorial limits of the Kingdom are concerned, those stations only may be worked by consent of the Director-General of Posts and Telegraphs when due regard is given to the conditions prescribed in said permit.

3. Contravention of the rules as set forth in parts 1 and 2 of this article is allowed under under special conditions, the requirements of good seamanship should make this necessary.

ART. 2.—1. Foreign ship stations may exchange telegrams or have a conversation with radiotelegraph or telephone stations destined for public service under reserve of the special rules, which might be valid for any one of these stations.

2. The exchange of traffic with stations not destined for public service is permitted under reserve of the special rules which might be valid for any one of these stations, and in so far as in the opinion of one or more public stations, the general public radio telegraphic or telephonic service is not interfered with.

3. All traffic of foreign ship stations is immediately to be suspended, as soon as such is requested by any Dutch coast station open for general public service.

ART. 3.—1. It is forbidden that by means of foreign ship stations hindrance should be given to the exploitation or the use of Government radiotelegraphs and telephones be they destined for public service or not, or to the exploitation of other radiotelegraphs and telephones destined for public service.

2. Foreign ships must cease working of their stations as soon as they observe or when they are informed, that their working gives rise to an interference as described in part 1 of this article.

ART. 4.—1. The Minister of Waterways may suspend the working of foreign ship stations either completely or partly as soon as it is judged necessary.

2. The Director-General of Posts and Telegraphs has equal competency as far as it concerns suspension at certain places or daily during certain hours.

The licensees of foreign ship stations are subject to and henceforth obliged to adhere to all Regulations referring to radiotelegraphy or telephony which are prescribed by the International Radio Telegraph Convention with final protocol and Regulations of London such as it is at present (Staatsblad 1913 Nr 132), of, later on, also for Holland, might be modified, either are or shall be prescribed by any other International agreement to which Holland accedes or will accede.

NEW CALEDONIA

(See FRANCE.)

NEWFOUNDLAND

(See map on p. 153.)

THE Island of Newfoundland lies between 46° 37′ and 52° 39′ north latitude; its longitude stretching from 52° 35′ to 59° 25′ west. Its north-western side is bounded by the Gulf of St. Lawrence, whilst the Straits of Belle Isle divide it from the North American Continent. It is triangular in shape (almost equilateral), with Cape Bauld on the north, Cape Race on the south-east, and Cape Ray on the south-west.

Newfoundland ranks as the oldest British colony, having been formally occupied by Sir Humphrey Gilbert in August, 1583. A Governor was first appointed in 1728, and in 1855 " Responsible Government " was accorded.

The Executive is vested in a Governor aided by an Executive Council with a legislature of two houses.

CONTROL.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	Title.	Address.
Dr. Robinson	Postmaster-General	St. John's
Mr. Wm. Campbell	Post Office Inspector	do.
Mr. H. W. Le Messurier C.M.G.	Deputy Minister of Customs	do.

Mr. H. W. Le Messurier, C.M.G., the Deputy Minister of Customs, refuses clearance to any vessels of Newfoundland Legislation not licensed in conformity with the Acts, or whose operators are not in possession of provisional service certificates issued by the Postmaster-General. These certificates cover a period of six months, and are renewable. They are not granted until the applicant is pronounced proficient, the proving of such efficiency resting with the Marconi Wireless Telegraph Company, Ltd., of Canada, whose local manager co-operates with the Postmaster-General.

ORGANISATION.

The Colony is proud of its association with the first wireless message flashed across the Atlantic. This was received by Senatore Marconi himself on Signal Hill, an eminence overlooking the Narrows of St. John's. Newfoundlanders hope that ere long some suitable memorial may be erected on Signal Hill of this epoch-making event.

The Sealing Industry forms an important item in the industrial activities of the Colony, and the disaster of 1914 (wherein the *Southern Cross* was lost with all hands) led to the instalment of wireless equipment on the fleet of sealers, which was made compulsory by legislation to that effect.

At the present time the following stations exist :—

Public service to ships	4
Government service only	1
Public inland traffic	1
Direction-finding service	1

ADMINISTRATION.

The general Regulation of Wireless is governed by the Posts and Telegraph Acts, 1891 to 1906.

We subjoin :—

A—Act of 1905 (Cap. VII).
B—Post and Telegraph Act, 1906.
C—Wireless Telegraphy (Steamers) Act, 1914.
D—Wireless Licence.

THE ACT OF 1905, CAP. VII.

A This Act refers to taxes upon business transacted by telegraph and telephone companies within and in transit through the Colony. Clause 2, Section 2, reads as follows :—

A sum equal to one per cent. in manner hereinafter provided of the total amount received by or due to the company in respect of all telegraphic messages passing over the land lines of the company or transmitted or received by any wireless method of telegraphy to or from any place within this Colony from or to any other place within this Colony during a period of twelve calendar months ending on the first day of May of each year : Provided that this sub-section shall not apply to messages which originate or are delivered in any place outside the Colony.

The first of such payments shall be made on the 30th day of June, 1906, in respect of the period of twelve months ending on the preceding first day of May.

Section 4 of the same Clause (2) reads as follows :—

A sum of four thousand dollars ($4,000) in respect of every wireless telegraph station or other means of communication by wireless methods of telegraphy between this Colony and any place, ship or vessel outside this Colony, for the time being belonging to or worked by or on behalf of the company which now is or hereafter shall be established in this Colony.

The first of such payments shall be made on the 30th day of June, 1906 : Provided that if the Governor in Council is satisfied that any such wireless telegraph station or other such means of communication is established for the purpose only of reporting passing ships or vessels, he may dispense the payment of such last-named sum and discharge the company from liability therefor in respect of such station or means of communication.

Clause 1 (1) of the Act of June 15th, 1905, Cap. XXI, reads :—

Whenever in the opinion of the Governor

an emergency shall have arisen in which it is expedient for the public service that the Government of the Colony shall have control over the transmission of messages over any telegraph line, telephone line, or by any other form of telegraphy, it shall be lawful for the Governor in Council at any time to assume and for any length of time retain possession of any telegraph line, telephone, or any form of telegraphy in this Colony, and of all things necessary for the efficient working thereof, and may for the same time require the exclusive service of the operators and other persons employed in working such telegraph line, telephone, or any form of telegraphy: and the company or other proprietor of such telegraph line, telephone or any form of telegraphy, shall give up possession thereof, and the operators and other persons so employed shall, during the time of such possession, diligently and faithfully obey such orders and transmit and receive such despatches as they are required to receive and transmit by any officer duly authorised by the Governor in Council, and every company or other proprietor, operator or person violating any of the provisions of this section shall incur a penalty not exceeding one hundred dollars ($100) for every refusal or neglect to comply with the requirements thereof, such penalty to be recovered by action in the name of the Minister of Finance and Customs, in a summary manner before a Stipendiary Magistrate or Justice of the Peace.

Post and Telegraph Act, 1906.

B 1. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy, in any place in this Colony, or on board any ship registered in this Colony, except under and in accordance with a licence granted in that behalf by the Postmaster-General, with the consent of the Governor in Council.

(2) Every such licence shall be in such form and for such period as the Postmaster-General may determine, and shall contain the terms, conditions, and restrictions on and subject to which the licence is granted, and any such licence may include two or more stations, places or ships.

(3) If any person establishes a wireless telegraph station without a licence in that behalf, or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of a misdemeanour, and be liable on conviction in a summary manner before a Stipendiary Magistrate to a penalty not exceeding fifty dollars, and on conviction on indictment to a fine not exceeding five hundred dollars or to imprisonment, with or without hard labour, for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Act except by order of the Postmaster-General.

(4) If a Stipendiary Magistrate is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship as aforesaid without a licence in that behalf, he may grant a search warrant to any police officer or any officer appointed in that behalf by the Postmaster-General, and named in the warrant, and a warrant so granted shall authorise the officer named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) When a fine under this Act is imposed by a Court, Judge or Magistrate, and the master or owner of any ship is ordered to pay the same and the same is not paid at the time and in the manner prescribed, the Court, Judge, or Magistrate making the order may, in addition to any other powers they may have for the purpose of compelling payment, direct the amount remaining unpaid to be levied by distress and sale of the ship, her tackle, furniture and apparel.

(6) The Postmaster-General may make regulations for prescribing the form and manner in which applications for licences under this Act are to be made, and, with the consent of the Governor in Council, the fees payable on the grant of any such licence.

(7) The expression "wireless telegraphy" means any system of communication by telegraph as defined in "The Post and Telegraph Acts, 1891 to 1904," without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

2. This Act shall be read with and form part of "The Post and Telegraph Acts, 1891 to 1904," and the said Acts and this Act may be cited as "The Post and Telegraph Acts, 1891 to 1906."

Wireless Telegraphy (Steamers) Act.

C The following Act respecting the provision of wireless telegraphy on steamers engaged in the trade of Newfoundland was passed on September 4th, 1914:—

1. Every steamer to which this Act applies shall be provided:—

(1) With a wireless telegraph installation approved of by the Minister of Marine and Fisheries;

(2) With at least one qualified wireless operator approved of by the Postmaster-General;

(3) With a Morse signalling apparatus approved by the Minister of Marine and Fisheries;

(4) With at least one person on board capable of operating such signalling apparatus and of reading signals from other ships.

2. The wireless telegraphy installation provided on a ship to which this Act applies shall be maintained in good order and shall be attended to by an operator qualified as aforesaid in accordance with rules and regulations to be made by the Governor in Council under this Act for the purposes thereof.

3. No steamer to which this Act applies shall receive a clearance at any Custom House for the Seal Fishery or otherwise unless and until the Collector is satisfied that the provisions of this Act in respect of said steamer have been complied with.

4. If any requirement of this Act is not complied with in the case of any steamer to which this Act applies, the master or owner shall be liable for each offence to a fine of twenty-five hundred dollars, to be recovered in a summary manner before a Stipendiary Magistrate.

5. This Act shall apply to any steamer

which ordinarily is engaged in prosecuting the Seal fishery from any port of this Colony, when engaged in the Seal fishery or when carrying more than sixty persons; and to any other vessel carrying passengers from or within this Colony when named by the Governor in Council in a Proclamation to be published in the *Royal Gazette*.

6. Nothing in this Act shall affect the obligation to obtain a licence for a wireless telegraphy installation under "The Postal and Telegraph Acts, 1891 to 1906," or prevent the Governor in Council or other person exercising a like control over such wireless telegraphy in times of war or otherwise as may be exercised in respect of other wireless telegraphy.

D The various Acts printed above affect the Regulations of Wireless Telegraphy in the Colony of Newfoundland, supplemented in actual working by regulations which appear in the form "W. 19 Ship Licence," which is "issued in accordance with the provisions of the London Convention 1912." This licence consists of twenty clauses and a schedule. Of these, Clauses 1 to 6 consist of the ordinary definitions of terms and provisions for good order in working.

Clause 7 reads as follows:—

7. (i) If and whenever any department of the Government shall require the licensee, his servants or agents to transmit, by means of the licensed apparatus, any message on His Majesty's service (including messages to and from ships of His Majesty's Royal Navy or Newfoundland or Canadian Government vessels), such messages shall have priority over all other messages, and the licensee, his servants and agents shall, as soon as reasonably may be, transmit the same, and shall, until transmission thereof, suspend transmission of all other messages, and the rates to be charged on such messages shall not exceed half the rates charged the ordinary public.

(ii) The licensee shall not be entitled to claim any compensation in respect of the suspension of the transmission of messages as aforesaid.

Clauses 8 and 9 provide respectively for transmission of Distress Signals and Secrecy, whilst Clauses 10, 11 and 12 provide for the inspection by the Postal Officials of the Register of Messages kept on board.

Clauses 13 to 16 inclusive are formal clauses specifying the jurisdiction exercised by the Postmaster-General.

Clause 17 reads as follows:—

17. (1) If, and whenever, in the opinion of the Postmaster-General or any officer in command of one of His Majesty's ships of war, an emergency shall have arisen in which it is expedient for the public service that the Government shall have control over the transmission of messages by the licensed apparatus it shall be lawful for the said Postmaster General, by warrant under his hand, to direct and cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty and to be used for His Majesty's service, and, subject thereto, for such ordinary services as to the said Postmaster-General may seem fit, and in that event, any person authorised by the said Postmaster-General may enter upon the stations of the licensee, and take possession thereof and use the same as aforesaid.

(2) The Postmaster-General or any officer in command of one of His Majesty's ships of war may when he considers such an emergency as aforesaid to have arisen, instead of taking possession of the stations of the licensee, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus, either wholly or partly and in such manner as he may direct, and such persons may enter upon the licensee's premises accordingly, or the said Postmaster-General or officer may direct the licensee to submit to him all messages tendered for transmission or arriving by the licensed apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent and generally to obey all such directions with reference to the transmission of messages as the said Postmaster-General or officer may prescribe, and the licensee shall obey and conform to all such directions.

(3) In any such case as aforesaid, if the licensee shows that during the exercise of any of the powers aforesaid, his receipts for the licensed apparatus with respect to which the said powers have been exercised have been less than his receipts from the same source during a corresponding period, the Government shall pay to the licensee, as compensation for any loss of profit sustained by the licensee by reason of the exercise by the Postmaster-General of any of the powers hereby reserved, such sum as may be settled between the Postmaster-General and the licensee by agreement or as in case of difference may be determined by arbitration. Provided always that no such compensation as aforesaid shall be paid if and so far as the powers hereby reserved to the Postmaster-General are exercised for the purpose of preventing direct communication with any of His Majesty's enemies, and, save with the consent of the Postmaster-General no such compensation shall be paid if and so far as the powers aforesaid are exercised for the purposes of preventing direct or suspected communication with any of His Majesty's enemies or of protecting the interests of His Majesty under the apprehension of impending war.

Clauses 18, 19, and 20 refer to Penalties and the inclusive privileges of the Postmaster-General.

The Schedule (above referred to) runs as follows:—

Name of Station.	Normal Range.	Description of Receiving Apparatus.	Wave Length.	Source of Power and Maximum Output.	Maximum Power taken by Transmitting Instruments.		Frequency of Alternator, if any.	Ship Charge.
					Volts.	Amps.		

NOTE.

In 1906 an agreement was made under which the Marconi Wireless Telegraph Company of Canada undertook to operate all the Labrador stations during the fishing season of each year, the Newfoundland Government to pay the company an annual royalty, and the revenue accruing from this traffic to go to the latter, who further agreed to forward all traffic over the Newfoundland Government Postal Telegraph System.

The success of this arrangement prompted the Government to propose an extension of the system on the Labrador by two or more stations—the Marconi Company to erect and operate these stations on the terms provided in the agreement. In the summer of 1910 stations were accordingly erected by the Marconi Company at Cape Harrison and Mokkovik. In 1911 it was agreed to establish a station between Indian Harbour and Cape Harrison to complete the chain on the Labrador.

After further negotiations, an important agreement was executed in December, 1912, which covers the following points: The old agreement terminating in 1916 is extended for a further period of ten years terminating in 1926; all other undertakings entered into in the earlier agreement will be continued until 1926. The Marconi Company has erected and is operating a station at Fogo, on the East Coast of Newfoundland—this station to be the property of the Marconi Company, and to be exempt from the Government tax of $4,000 during the term of the agreement.

NEW GUINEA

(See map on p. 129.)

NEW HEBRIDES

(SEE PACIFIC ISLANDS.)

NEW ZEALAND

THE Dominion of New Zealand lies about 1,200 miles south-east of the mainland of Australia, and consists of three main islands in the South Pacific Ocean, known as the North, South, and Stewart Islands. They stretch between 33° 0′ and 53° 0′ south latitude; their longitude varying from 160° 0′ east to 173° 0′ west. The Colony includes several groups of smaller islands, and lying at some distance from those which form the centre of the Dominion.

The initial discovery is attributed to the Dutch explorer, Abel Jansen Tasman, who visited the South Island on December 13th, 1642. The first settlement of Europeans was made in 1814, British sovereignty was proclaimed in 1840, and the independence of the Colony dates from May 3rd, 1841. The constitution rests upon the Act of 1852, under which the Executive authority is vested in a Governor assisted by a Council of Ministers with a legislature of two houses.

CONTROL.

The Post and Telegraph Department is responsible for the administration of wireless telegraphy in New Zealand. The permanent head of this Department is the Secretary of the General Post Office at Wellington.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
The Rt. Hon. Sir Joseph Ward, Bart., K.C.M.G., P.C.	Postmaster-General and Minister of Telegraphs.	Wellington
W. R. Morris, I.S.O.	Secretary, Post and Telegraph Department	Wellington
R. B. Morris	First Assistant Secretary	Wellington
H. A. R. Huggins	Assistant Secretary	Wellington
E. A. Shrimpton, M.I.E.E.	Chief Telegraph Engineer	Wellington
A. Gibbs, A.M.I.E.E.	Assistant Telegraph Engineer	Wellington
F. T. R. Johnston	Controller of Accounts	Wellington

In July, 1914, Regulations were made for the control of ships carrying wireless telegraph apparatus while within the territorial waters of New Zealand. The Regulations relating to ship stations were also amended by new Regulations issued on September 7th, 1914.

No licences are granted for amateur or experimental stations in New Zealand, and the erection of such stations is prohibited.

ORGANISATION.

The first wireless installation was placed in the tower of the General Post Office at Wellington in June, 1910, and experiments were carried out with different wireless systems. Later on a "Telefunken" set was installed, and a wireless telegraph office opened for commercial work on July 26th, 1911. At that time there were not more than half a dozen ships fitted with wireless apparatus trading to the Dominion; now quite a number of New Zealand ships carry wireless apparatus, as well as a large number of vessels registered in other countries and trading to New Zealand ports.

On October 14th, 1912, the G.P.O. station was replaced by one of 2½-kw. upon Mount Wakefield, immediately behind the City of Wellington. At this station, known as "Radio-Wellington," a continuous service is maintained.

On October 24th, 1912, a 2½-kw. station was established on the roof of the Post Office at Auckland.

The installation of a wireless set of 2½-kw. power on the Government cable steamer *Tutanekai* was completed on June 20th, 1912. The equipment has been found to be of much service in aiding in the work of the repair of submarine cables.

A wireless station was opened at CHATHAM ISLANDS on September 18th, 1913, connecting this group of islands with the mainland of New Zealand and extending the range of communication eastward. Position: 47° 57′ south, 176° 31′ west. Hours: 9 a.m. to 1 p.m., 3 p.m. to 5 p.m., and 7 p.m. to midnight. The normal range of the above-mentioned 2½-kw. stations is 300 miles by day and 600 miles by night.

The high-power stations at Awanui and Awarua were opened for public business on December 18th, 1913. These stations are of 30-kw. primary power Telefunken system, and were undertaken primarily for defence purposes. They are required to communicate with Sydney during the day as well as at night. Position of Awanui: 34° 54′ south, 173° 18′ east; position of Awarua: 46° 30′ south, 168° 23′ east. Both stations observe the same hours—viz., 6.30 p.m. to midnight, but a continuous listening service is kept for distress signals.

At the present time five stations in New Zealand are open for public service with ships.

ADMINISTRATION.

A—Extracts from the Post and Telegraph Act (Part X.), 1908.
B—Extracts from Amendment Acts of 1911 and 1913.
C—Regulations under Act of 1913. (Ships not registered in New Zealand.)
D—Regulations (affecting ships registered in New Zealand).
E—Regulations as to ships being provided with Wireless (October, 1913).

POSTS AND TELEGRAPHS ACT.

A The following extracts from Part X. of the Post and Telegraph Act, 1908, and from the Post and Telegraph Amendment Acts, 1911 and 1913, relate to wireless telegraphy in the Dominion:—

162. The Governor may from time to time establish stations for the purpose of receiving and transmitting telegraph messages within New Zealand or between New Zealand and parts beyond New Zealand by what is commonly known as "wireless telegraphy," including in that expression every method of transmitting messages by electricity otherwise than by wires, whether such method is in use at the time of the coming into operation of this Act, or is hereafter discovered or applied.

163. The provisions of Part VII. of this division of this Act shall, as far as is applicable, *mutatis mutandis*, extend and apply to stations established under this part of this Act, and to communications by wireless telegraphy.

164. Every person who erects, constructs, or establishes any station or plant capable of transmitting or receiving wireless telegraphic signals without having first obtained the consent of the Governor in Council is liable to a fine not exceeding five hundred pounds, and any plant, machinery, instruments, and material used by him for such purpose may be forfeited and dealt with as the Minister directs.

Part VII. of this division of the Act referred to deals with the construction and regulation of electric lines. It authorises the Governor to establish electric lines and purchase lines and plant. He may make regulations as to the management, working and maintenance of any telegraph. Any officer or person employed in the working of any telegraph who improperly divulges the contents of any telegram transmitted or presented for transmission by such telegraph, or the purport of such telegram, is liable to a fine not exceeding one hundred pounds, or to imprisonment with hard labour for any period not exceeding six months.


NEW ZEALAND
Chatham I
English Mls. 500
C. Maria van Diemen
North Cape
Awanui Radio
Whangarei
Dargaville
Hauraki Gulf
AUCKLAND
Thames
NORTH ISLAND
Bay of Plenty
East C.
Hamilton
Waikato R.
Taupo
Gisborne
Mahia Pen.
Hawke Bay
Napier
New Plymouth
C. Egmont
Wanganui R.
Wanganui
TASMAN SEA
Cook Strait
Palmerston North
Masterton
WELLINGTON
C. Palliser
C. Farewell
Tasman Bay
Nelson
Blenheim
Westport
Buller R.
Clarence R.
Kaikoura
SOUTH ISLAND
Greymouth
Hokitika
Hurunui R.
PACIFIC OCEAN
Pegasus Bay
CHRISTCHURCH
Banks Peninsula
Rakaia R.
Cascade Pt.
Canterbury Bight
Timaru
L. Wanaka
Waitaki R.
L. Wakatipu
Oamaru
Te Anau
Clutha R.
DUNEDIN
Invercargill
Awarua Radio
Foveaux Strait
Stewart I.
South West Cape
Public correspondence with ships
English Miles 50 100
Longitude East 172 of Greenwich
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EXTRACTS FROM AMENDMENT ACTS OF 1911 AND 1913.

Post and Telegraph (Amendment) Act, 1911.

B 3. (1) The Minister of Telegraphs may, in accordance with regulations to be made in that behalf by the Governor in Council, grant licences for the installation and working of apparatus for wireless telegraphy (within the meaning of Part X. of the principal Act) on board any ship registered in New Zealand, and whether on the high seas or in New Zealand waters.

(2) Subject to any such regulation, every such licence shall be in such form and for such period, and shall contain such terms, conditions, and restrictions, as the Minister of Telegraphs thinks fit.

(3) The Governor may by Order in Council make such regulation as he thinks proper as to the granting of such licences, and as to the form, period, terms, conditions, and restrictions thereof and as to the fees payable in respect thereof.

Post and Telegraph (Amendment) Act, 1913.

9. (1) The Governor may from time to time, by Order in Council, make such regulations as he thinks proper governing the use of wireless telegraph apparatus on merchant ships whether foreign ships or British ships not registered in New Zealand, while within the territorial waters of New Zealand.

(2) Such regulations may provide for the detention of any merchant ship on which a breach of the regulations has been made, pending the institution and determination of proceedings in respect of such breach and the recovery of any fine imposed in respect thereof.

REGULATIONS UNDER ACT OF 1913.

Affecting Ships not Regulated in New Zealand.

C The following regulations are for the control of ships carrying wireless telegraph apparatus while within territorial waters of New Zealand.

Whereas by Section 9 of the Post and Telegraph Amendment Act, 1913 (hereinafter termed " the said Act "), it is provided that the Governor may from time to time by Order in Council make such regulations as he thinks proper governing the use of wireless telegraph apparatus on merchant ships, whether foreign ships or British ships not registered in New Zealand, while within the territorial waters of New Zealand, and that such regulations may provide for the detention of any merchant ship on which a breach of the regulations has been made pending the institution and determination of proceedings in respect of such breach and the recovery of any fine imposed in respect thereof:

Now, therefore, His Excellency the Governor of the Dominion of New Zealand, in pursuance and exercise of the power and authority conferred upon him by the said Act, and acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby make the following regulations; and doth hereby order that such regulations shall have effect on and from the date of publication of this Order in Council in the *New Zealand Gazette*.

Further Regulations.

1. In these regulations, if not inconsistent with the context:—

" Territorial waters of New Zealand " means and includes all tidal waters included within the Dominion of New Zealand, and all parts of the open sea within one marine league of the coasts of that Dominion measured from low-water mark.

" Minister of Telegraphs " means the Minister of Telegraphs for the time being.

" Wireless Telegraphy " has the same meaning as in Section 162 of the Post and Telegraph Act, 1908.

" Telegraph " has the same meaning as in Section 119 of the Post and Telegraph Act, 1908.

" Naval signalling " means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station, whether a coast station or a ship station.

" The Admiralty " means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

" Coast station " means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

" Ship station " means a wireless telegraph station established on board a ship which is not permanently moored.

2. These regulations shall apply only to foreign merchant ships and to British merchant ships not registered in New Zealand, while such British or foreign ships are within the territorial waters of New Zealand.

3. All apparatus for wireless telegraphy on board a merchant ship while in the territorial waters of New Zealand shall be worked in such a way as not to interfere with Naval signalling, or with the working of any wireless telegraph station lawfully established, installed or worked in the Dominion of New Zealand or the territorial waters thereof; and, in particular, the said apparatus shall be so worked as not to interrupt or interfere with the transmission of messages between wireless telegraph stations established on ships at sea and wireless telegraph coast stations.

4. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any of the harbours of the Dominion of New Zealand, except with the consent in writing of the Minister of Telegraphs.

5. The foregoing regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

6. If and whenever an emergency shall have arisen in which it is expedient in the public interest that His Majesty's Government shall have control over the transmission of messages by the said apparatus, it shall be lawful for any officer of His Majesty's Navy or Army, or for any other person authorised in that behalf by the Admiralty, or by the Minister of Telegraphs, to take possession of or to cause the said apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty, and to be used for His Majesty's service and subject thereto for such ordinary services as to the said officer or person may seem fit; and in that event any person authorised by the said officer or person may enter upon any ship on which such apparatus is installed and take possession of the said apparatus and use the same as aforesaid

7. Any such officer or person may in such event as aforesaid, instead of taking possession of the said apparatus as aforesaid, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the said apparatus, either wholly or partly, and in such manner as he may direct, and such persons may enter upon any ship on which the said apparatus is installed accordingly; or the said officer or person may direct the person or persons in charge of the said apparatus to submit to him, or any person authorised by him, all messages tendered for transmission or arriving by the said apparatus, or any class or classes of such messages, to stop or delay the transmission of any messages, or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said officer or person may prescribe, and the said person or persons in charge of the said apparatus shall obey and conform to all such directions.

8. If any breach of these regulations is committed by any person on board any ship while in the territorial waters of New Zealand, the person so committing the same and the owner and master of the ship shall be severally liable on summary conviction to a fine not exceeding £100.

9. Whenever the Minister of Telegraphs or the Secretary of the Post Office has reasonable cause to believe or suspect that any breach of these regulations has been committed on board any ship while in the territorial waters of New Zealand, he may give notice in writing to the Collector of Customs at any port in New Zealand to detain the ship, under Section 9 of the Post and Telegraph Amendment Act, 1913, until the sum of £100, or such smaller sum as may be specified in the notice, has been deposited with the Collector by or on behalf of the owner of the ship.

10. If on the receipt of that notice, or at any time within three months thereafter, the ship is found within such port, the Collector of Customs shall withhold the certificate of clearance of the ship, under Section 35 of the Customs Act, 1913, until and unless the aforesaid sum is deposited with him or the aforesaid notice of detention is withdrawn.

11. If within six months after the date of the offence in respect of which the ship has been detained a conviction for that offence is obtained against any person, the sum so deposited shall be available for the satisfaction of any fine and costs imposed or awarded by the conviction, and the residue, if any, shall be returned to the person by whom the deposit was made.

12. If within the period of six months aforesaid no such conviction is obtained, the sum so deposited shall be returned to the person by whom it was deposited.

WIRELESS TELEGRAPH REGULATIONS FOR SHIP STATIONS.

Affecting Ships registered in New Zealand.

Whereas by Order in Council dated the twentieth day of November, one thousand nine hundred and eleven and published in the *New Zealand Gazette* of the twenty-third day of November, one thousand nine hundred and eleven, regulations were made under the authority of the Post and Telegraph Amendment Act, 1911 (hereinafter termed "the said Act"), as to the granting of licences for the installation and working of apparatus for wireless telegraphy on board any ship registered in New Zealand, and whether on the high seas or in New Zealand waters, and as to the form, period, terms, conditions, and restrictions thereof, and as to the fees payable in respect thereof: And whereas it is desirable to revoke such regulations, and to make others in lieu thereof.

Now, therefore, His Excellency the Governor of the Dominion of New Zealand, in pursuance and exercise of the power and authority conferred upon him by the said Act, and of all other powers and authorities in that behalf enabling him, and acting by and with the advice and consent of the Executive Council, of the said Dominion, doth hereby revoke the regulations made by the above-mentioned Order in Council, and in lieu thereof doth hereby make the following regulations for the purposes hereinbefore mentioned; and doth hereby order that such regulations and the revocation of the regulations first before recited shall have effect on and from the date of publication of this Order in Council in the *New Zealand Gazette*.

Regulations.

1. In these regulations, if not inconsistent with the context:—

"Minister of Telegraphs" means the Minister of Telegraphs for the time being.

"Wireless Telegraphy" has the same meaning as in Section 162 of the Post and Telegraph Act, 1908.

"Telegraph" has the same meaning as in Section 119 of the Post and Telegraph Act, 1908.

"Naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station, whether a coast station or a ship station.

"The Admiralty" means the Commissioners for executing the office of Lord High Admiral of the United Kingdom of Great Britain and Ireland.

"The International Telegraph Convention" and the "International Telegraph Regulations" mean respectively the International Convention of St. Petersburg dated the 10th-22nd July, 1875, and the service regulations made thereunder; and include respectively any modifications of the convention or regulations made from time to time.

"The Radiotelegraph Convention, 1912," means the convention signed at London on the 5th day of July, 1912, and the service regulations made thereunder; and includes any modification of the convention or regulations made from time to time.

"Coast station" means a wireless telegraph station which is established on land or on board a ship permanently moored, and which is open for the service of correspondence between the land and ships at sea.

"Ship station" means a wireless telegraph station established on board a ship which is not permanently moored.

2. The Minister of Telegraphs may, at the request of any person or company desirous of establishing, installing, working, and using on ships belonging to such person or company, and registered in New Zealand, apparatus for wireless telegraphy, grant to such person or company (hereinafter called "the licensee")

L

a licence, in the form of the Schedule hereto, for the period, upon the terms, and subject to the conditions and restrictions hereinafter appearing.

3. Each ship station is bound to exchange radiotelegrams with any coast station, or with any other ship station, without distinction as to the radiotelegraph system adopted by that station.

4. Each ship station shall be of such class mentioned in Article 13 of the Service Regulations annexed to the Radiotelegraph Convention, 1912, as is specified in the licence issued in respect thereof, and the equipment of the station, hours of duty observed, and other requirements shall be appropriate to such class in accordance with the provisions of the Radiotelegraph Convention, 1912.

5. The apparatus used at all ship stations shall, as far as possible, be in keeping with scientific and technical progress. The waves emitted must be as pure and as little damped as possible.

6. The apparatus must be capable of transmitting and receiving at a speed of at least equal to twenty words per minute, the word being reckoned at the rate of five letters.

7. The apparatus shall be so constructed as to be capable of using wave-lengths of 600 to 300 metres as measured by the standard of measurement in use by the Post and Telegraph Department for the time being; and such other wave-lengths not exceeding 600 metres as shall be authorised from time to time by the Minister of Telegraphs; Provided always that the wave-length of 600 metres shall normally be used for communication, and, further, that the wave-length of 1,800 metres may be used for transmission in the exceptional case referred to by Article 35 (2) (*a*) of the Service Regulations annexed to the Radioletegraph Convention, 1912; Provided, further, that only wave-lengths of 600 metres shall be used by the licensee during the period of any war in which the United Kingdom is engaged.

8. The licensed apparatus shall not be used by the licensee, or by any other person either on behalf or by permission of the licensee, for the transmission or receipt of messages except messages authorised by these regulations; and the licensee shall not, except with the consent in writing of the Minister of Telegraphs, send or receive messages from or at the licensed apparatus when in any harbour in the Dominion of New Zealand.

9. (1) The licensee shall not by the transmission of any message by means of the licensed apparatus or otherwise by the use of the licensed apparatus, interfere with naval signalling.

(2) If the Admiralty are of opinion that the working of the licensed apparatus at any ship station is inconsistent with the free use of naval signalling, the licensee shall, when required in writing by the Minister of Telegraphs so to do, close the said station.

(3) These provisions for the protection of naval signalling shall be construed to be without prejudice to the generality of any other provisions of the licence.

10. The licensee shall observe the International Telegraph Convention and International Telegraph Regulations so far as the said convention and regulations are capable of being applied to wireless telegraphy in common with ordinary land and submarine telegraphy.

11. The licensee shall observe the provisions of any regulations from time to time made under the provisions of the Post and Telegraph Act, 1908, and its amendments, by the Governor in Council or by the Minister of Telegraphs in relation to the conduct of wireless telegraph business, so far as the same are applicable to the licensee.

12. The licensee shall observe the provisions of the Radiotelegraph Convention, 1912.

13. The licensee shall comply with all such directions and observe all such rules as may be given or made by the Minister of Telegraphs from time to time for the purpose of preventing interference with the working of any other wireless telegraph station, and for enabling the messages exchanged by means of the licensed apparatus to be distinguished from those emanating from any other wireless telegraph station.

14. The licensed apparatus shall not, without the consent of the Minister of Telegraphs be altered or modified in respect of any of the particulars referred to in the license issued in respect thereof, and such apparatus shall at all times be maintained in good working order.

15. Except as provided in these regulations, the licensee shal transmit messages by means of the licensed apparatus on equal terms, without favour or preference, whether as regards rates of charge, order of transmission, or otherwise.

16. The licensee shall, so far as possible, receive from ships and light stations all requests for assistance and all signals of distress, and shall answer such requests and signals and retransmit them with the least possible delay, and with priority over all other messages, to the proper authorities by means of the licensed apparatus or by any other means in the power of the licensee.

17. The licensed apparatus at ship stations shall be worked only by a person or persons holding a certificate or certificates issued or recognised by the Minister of Telegraphs. Certificates shall be granted to persons of British nationality possessing the qualifications prescribed by the Radiotelegraph Convention, 1912, and shall be in such form and subject to such conditions, directions, or rules as the Minister of Telegraphs shall from time to time prescribe: and such certificates may at any time be withdrawn at the discretion of the Minister of Telegraphs in case of misconduct, or breach on the part of the holder of the Radiotelegraph Convention, 1912, or of any conditions, directions, or rules prescribed by the Minister of Telegraphs for the guidance of operators or for the working of such ship stations.

18. (1) The licensee, his servants and agents, shall not divulge the contents or the purport of the contents of any message, or make any use whatever of any message coming to his or their knowledge, other than to the addressee or his authorised agent, or to properly authorised officials of His Majesty's Government or of the Minister of Telegraphs, or to a competent legal tribunal.

(2) The licensee shall render to the Minister of Telegraphs such accounts as the Minister of Telegraphs shall direct in respect of all charges due or payable under the Radiotelegraph Convention, 1912, in respect of messages exchanged between the licensed ship stations and coast stations, and shall pay to the Minister of Telegraphs, at such times and in such manner as the Minister of Telegraphs shall direct, all sums which shall be due from the licensee under such accounts.

19. The licensee shall keep full accounts, records, and registers of all messages transmitted by means of the licensed apparatus; and in such registers each of such messages shall be accompanied by its identifying number and date, and full particulars of its place of origin and of ultimate destination, and such further particulars as the Minister of Telegraphs shall from time to time reasonably require to be shown. The licensee shall preserve all used message forms written and printed, and transcripts of messages, and all other papers for such period as is from time to time prescribed by the Radiotelegraph Convention, 1912, and, in default of any provisions on the subject in the said convention, for such period as is from time to time prescribed by the International Telegraph Regulations; and such registers and message papers shall be open to the inspection of the Minister of Telegraphs or his authorised officers.

20. The Minister of Telegraphs, and any agent authorised in that behalf in writing by him, may at all reasonable times enter upon any licensed ship station for the purpose of inspecting, and may inspect, any apparatus fixed or being in such station for the purpose of sending and receiving messages by wireless telegraphy, and all other telegraphic instruments and apparatus fixed or being in such station, and the working and user of such apparatus and telegraphic instruments.

21. The licensee shall carry on every ship on which a ship station is established a print or copy of the licence, certified under the hand of an appropriate officer of the Minister of Telegraphs to be a true copy, and shall produce such print or copy for inspection if required to do so by the competent authorities of the countries where the ship calls, and also such documents as may be prescribed by the Minister of Telegraphs for the purpose of enabling the licensee to communicate with coast stations and ship stations, in accordance with the Radiotelegraph Convention, 1912.

22. (1) Every licence shall be in force from the date of the granting thereof until the 31st December of the year in which it is issued, and no longer; but may be renewed from year to year.

(2) The licensee shall pay to the Minister of Telegraphs for and in respect of the licence granted, and of every renewal thereof, a royalty of 5s. in respect of each ship station included in the licence.

(3) All royalties payable under any licence shall be payable on the date of the granting or renewal thereof, as the case may be.

23. Except with the consent in writing of the Minister of Telegraphs, the licensee shall not assign, underlet, or otherwise dispose of or admit any other person or body to participate in the benefit of any licence.

24. If and whenever an emergency shall have arisen in which it is expedient in the public interest that His Majesty's Government shall have control over the transmission of messages by the licensed apparatus, it shall be lawful for any officer of His Majesty's Navy or Army, or for any other person authorised in that behalf by the Admiralty, or by the Minister of Telegraphs, to take possession of or to cause the licensed apparatus or any part thereof to be taken possession of in the name and on behalf of His Majesty, and to be used for His Majesty's service and subject thereto for such ordinary services as to the said officer or person may seem fit; and in that event any person authorised by the said officer or person may enter upon any ship on which any such apparatus is installed and take possession of the said apparatus and use the same as aforesaid.

25. Any such officer or person may in such event as aforesaid, instead of taking possession of the licensed apparatus as aforesaid, direct and authorise such persons as he may think fit to assume the control of the transmission of messages by the licensed apparatus either wholly or partly and in such manner as he may direct, and such persons may enter upon any ship on which any apparatus is installed accordingly; or the said officer or person may direct the licensee, his servants or agents, to submit to him, or any person authorised by him, all messages tendered for transmission or arriving by the licensed apparatus, or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him or his agent, and generally to obey all such directions with reference to the transmission of messages as the said officer or person may prescribe, and the licensee, his servants or agents, shall obey and conform to all such directions.

26. In any of the following cases, that is to say:—

(*a*) In case any sum of money which ought to be paid by the licensee to the Minister of Telegraphs under or by virtue of these regulations shall be in arrear and unpaid for one calendar month after the time at which the same ought to be paid under or by virtue of the provisions herein contained; or

(*b*) In case of any breach, non-observance, or non-performance by or on the part of the licensee, his servants or agents, of any of the provisions (other than a provision for the payment of money) or conditions herein contained,—

then and in any such case the Minister of Telegraphs may, by notice in writing, revoke and determine the licence as to all or any of the ship stations thereby licensed, and thereupon the said licence shall absolutely cease, determine, and become void as to all or any of the said ship stations, as the case may be, but without prejudice to any right of action or remedy which shall have accrued to His Majesty under these regulations or otherwise.

27. Nothing in these regulations shall prejudice or affect the right of the Minister of Telegraphs from time to time to establish, extend, maintain, and work any system or systems of telegraphic communication (whether of a like nature to those licensed hereunder or otherwise) in such manner as he shall in his discretion think fit. Neither shall anything herein contained prejudice or affect the right of the Minister of Telegraphs from time to time to enter into agreements for or to grant licences relative to the working and use of telegraphs (whether of a like nature to those licensed hereunder or otherwise) or the transmission of messages in any part of New Zealand by means of wireless telegraphy, or by any other means, with or to any person or persons whomsoever, upon such terms as he shall in his discretion think fit. And (save as in these regulations expressly provided) nothing herein contained shall be deemed to authorise the licensee to exercise any of the powers or authorities conferred on or acquired by the Minister of Telegraphs by or under the Post and Telegraph Act, 1908.

28. Any notice, request, or consent (whether required to be in writing or not) to be given by the Minister of Telegraphs under these regulations may be under the hand of the Secretary

SCHE

Licence for the Installation and Working of Appara

Name of Ship on which Station established.	Class of Ship Station under the Radio-telegraph Convention, 1912.	Call-signal.	Nature of Services Performed.	Hours of Service.	Normal Range of Signalling in Nautical Miles.	
					By Night.	By Day.
1.	2.	3.	4.	5.	6.	7.

for the time being of the Post and Telegraph Department, and may be served by sending the same in a registered letter addressed to the licensee at the office or place of residence for the time being of the licensee, or, if such notice, request, or consent relates to any particular ship station, by delivery to the master of the ship upon which such station is installed; and any notice to be given by the licensee under these regulations may be served by sending the same in a registered letter addressed to the Secretary, General Post Office, Wellington.

29. All licences heretofore issued under the regulations hereby revoked shall continue in force, subject to the regulations under which they were issued, until the expiry of the current term thereof, but shall not be capable of renewal under the regulations so revoked.

REGULATIONS

As to Ships being provided with Wireless Telegraphy Apparatus.

Order in Council.

E At the Government House, at Wellington, this twentieth day of October, 1913.

Whereas it is enacted by Section 50 of the Shipping and Seamen Amendment Act, 1909, that the Governor may from time to time by Order in Council make regulations requiring ships registered in New Zealand, and carrying passengers, to be provided with apparatus for transmitting messages by means of wireless telegraphy, and may by such regulations prescribe fines not exceeding fifty pounds for any breach thereof by the owner or master of a ship. And whereas it is desirable to make such regulations:

Now, therefore, His Excellency the Governor of the Dominion of New Zealand, in exercise of the hereinbefore recited power and authority, and acting by and with the advice and consent of the Executive Council of the said Dominion, doth hereby make the following regulations, and doth hereby order that they shall come into force on July 1st, 1914:

Provided that, if in his opinion the circumstances justify it, the Minister of Marine may exempt any steamship from the operation of these regulations, and may limit the time for which any such exemption shall be in force.

Regulations.

1. Every steamship registered in New Zealand, and carrying passengers, which is engaged in the foreign or inter-colonial trade, except steamships trading to the Chatham, Auckland, Campbell, and Antipodes Islands, and every home trade steamship which is authorised by her ordinary survey certificate to carry not less than 150 passengers at sea, shall not leave or attempt to leave any port in New Zealand unless such steamship is equipped with an efficient apparatus for radio communication in good working order, to be operated by a person skilled in the use of such apparatus, which apparatus shall be capable of transmitting and receiving messages over a distance of at least one hundred miles, day or night.

2. Ships required by these regulations to carry the apparatus prescribed above shall be placed in the third class as defined by Article XIII. of the Detailed Service Regulations, appended to the International Radiotelegraph Convention, 1912—that is, they are not bound to perform any regular listening service.

3. The Minister of Marine may appoint inspectors for the purposes of these regulations, and such inspectors and superintendents of Mercantile Marine may visit any steamship required by these regulations to be equipped with apparatus for radio communication before they leave port, and ascertain if they are equipped with such apparatus the operation of which shall be carried out by a telegraphist holding a certificate as prescribed by Article X. of the Detailed Service Regulations attached to the International Radiotelegraphic Convention.

4. Where a passenger steamship subject to these regulations is without the apparatus and the operator prescribed, and is about to attempt to leave port, an inspector or superintendent shall:—

(a) Notify the master of the fine to which he will be liable and of the particulars in

DULE.

TUS FOR WIRELESS TELEGRAPHY ON BOARD SHIPS OWNED BY

Character of Apparatus.		Power.		
System of Radiotelegraphy with the Characteristics of the System of Emission.	Wave Lengths (in Metres).	Source and Maximum Output.	Maximum to be normally taken by Sending Instruments.	If Alternator is used, Number of Cycles per Second.
8.	9.	10.	11.	12.

respect of which the law has not been complied with;

(b) Notify at once the Collector of Customs, who may thereupon withhold the vessel's clearance until the requirements of these regulations are complied with;

(c) Prepare a report in writing of his action and transmit it to the Collector of Customs, who shall forward a copy to the Secretary of the Marine Department.

5. An inspector or superintendent may, at any time before a vessel subject to these regulations leaves port, require the master to give him a certificate, in the form set forth in the appendix hereto, that the wireless apparatus of his ship is sufficient and in good working order, and the master shall give such certificate before the vessel leaves port.

6. The power necessary to transmit signals shall at all times, while the vessel is under way, be available for the wireless operator's use.

7. Subject to the above regulations, the installation and operation of the apparatus required by them to be fitted shall be in conformity with the requirements of the Post and Telegraph Act, 1908, and its amendments, and the regulations made thereunder.

8. Any master or owner of a steamship committing a breach of these regulations is liable to a fine not exceeding £50.

APPENDIX.

This is to certify that the wireless operator in principal charge of the apparatus for radio communication on the s.s. "   " has this day certified to me in writing that the said apparatus is efficient and in good working order.

(Signed)..................................

Master.

NICARAGUA

THIS Central American State lies between Costa Rica on the south and Honduras on the north. Its area is estimated at 49,200 square miles, and it possesses a coast line of about 300 miles on the Atlantic, whilst that on the Pacific Ocean stretches for about 200 miles.

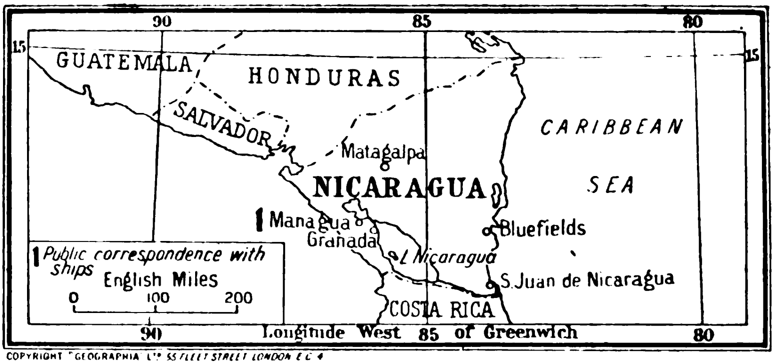
The present constitution came into force on April 5th, 1913. It vests the executive functions in a President, and the legislative power in a Congress of two houses. On February 18th, 1916, a treaty between Nicaragua and the United States was ratified, which laid down the conditions for the acquisition by the latter of naval bases on the Pacific and Atlantic coasts and of the projected canal route.

CONTROL.

The control of any stations which the Government might establish on its own account would be vested in the Minister of Progress and Public Works (*Ministerio de Fomento*) and the Postmaster-General.

ORGANISATION.

With regard to wireless telegraphy, none of the installations at present existing in Nicaragua are owned by the Government. The United States



Government possesses a station in Managua, the capital of the Republic, and there are two stations owned by private companies on the Atlantic Coast. These stations (with the exception of that owned by the American Government) have been erected under contract with the Government of the Republic, and are subject to the provisions of the London Radiotelegraphic Convention of 1912. Only one of them is open to public service with ships.

A small station has also been erected at the Eden Mines in Pis Pis mining district at the expense of the company, and is used exclusively by the firm.

ADMINISTRATION.

No special legislation bearing on the subject has been promulgated in the country. The above-mentioned convention constitutes the only law at present applicable to Nicaragua in the case of wireless telegraphy.

NIGERIA

THIS territory comprises the Colony and Protectorate of Nigeria and the approximate area is 336,000 square miles.

The Colony is practically identical with the old colony of Lagos, and comprises an area of 1,400 square miles. The Protectorate is divided into the Northern and Southern Provinces, which almost coincide with the old Protectorate of Northern and Southern Nigeria.

The Governor and Commander-in-Chief of the Colony is *ex-officio* the Governor and Commander-in-Chief of the Protectorate. The Northern and Southern Provinces are each administered by a Lieutenant-Governor. The Colony is administered by the Lieutenant-Governor of the Southern Province.

An Executive Council advises the Governor both for the Colony and Protectorate The Legislative Council confines its operation to, and considers, the laws and estimates of the Colony. The Nigerian Council is an advisory and deliberate body.

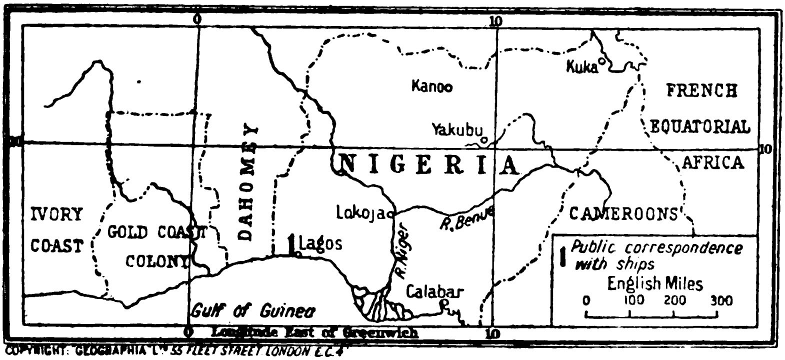
CONTROL AND ORGANISATION.

There is only one wireless station in Nigeria—at Lagos—and this was erected by the African Direct Telegraph Company in 1912. It is open to public service with ships. The Postmaster-General controls the wireless services.

ADMINISTRATION.

Wireless telegraphy is administered under :—

A—The Wireless Telegraphy Ordinance, 1916.
B—Regulations made under the Ordinance of 1916.



THE WIRELESS TELEGRAPHY ORDINANCE, 1916.

A 1. *Short Title.*—This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1916.

2. *Definition.*—Definition :—" Wireless Telegraphy " means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received.

3. *Licence for Wireless Telegraphy.*—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in Nigeria except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. *Apparatus Aboard Ships to be Worked in Accordance with Regulations.*—A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of Nigeria, otherwise than in accordance with regulations made under this Ordinance.

5. *Regulations.*—(1) The Governor may make regulations for carrying into effect the purposes of this Ordinance.

(2) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of Nigeria shall be subject to such further Regulations as may be made by the Governor and such Regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. *Search Warrant.*—If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf, or contrary to the provisions of any Regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by a superior officer and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. *Penalties and Procedure.*—Any person who shall offend against any provision of this Ordinance or any of the Regulations made thereunder shall be liable to a fine of fifty pounds, and the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

8. *Saving Section as Regards Electrical Apparatus.*—Nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than that of wireless telegraphy.

9. *Repeal No. 12 of 1913 of Southern Nigeria and Chapter 55 of the Laws of Northern Nigeria.*—The Wireless Telegraphy Ordinance, 1913, and the Wireless Telegraphy Proclamation are hereby repealed.

REGULATIONS MADE UNDER THE WIRELESS TELEGRAPHY ORDINANCE, 1916.

B The following Regulations are made by His Excellency the Governor-General under and by virtue of the provisions of section 5 of the Wireless Telegraphy Ordinance, 1916 :—

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of Nigeria shall be worked in such a way as not to interfere with :—

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in Nigeria or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations " Naval signalling " means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay or waters of Nigeria except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these Regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Made by His Excellency the Governor this 10th day of November, 1916.

NORWAY

THE most westerly of the Scandinavian nations emerged from the obscurities of myth and legend in the ninth century, and, after a vigorous separate national existence, was united with Sweden and Denmark under Queen Margaret by the Union of Kalmar in 1397. In 1814 Norway separated from Denmark, and Charles XIII of Sweden established his rule over the two countries. This co-partnership endured until the peaceful revolution of 1905 restored to the Norwegians their complete independence.

Norway covers an area of 124,130 square miles, and is ruled by a King with the co-operation of the Norwegian Parliament, which bears the historic title of " Stor-thing." Its capital is Christiania, picturesquely situated on a fjord, which owes its patronymic to the city.

CONTROL.

Radiotelegraphy is organised under the supervision of the Telegraph Department; whilst for naval and military purposes the War Office and Admiralty exercise jurisdiction over their own wireless section.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Colonel T. Heftye ..	Telegraph Department: Director-General of Telegraphs	Christiania
H. Petersen	Radio Engineer	Christiania (Telegraph Department)
H. Nickelsen.. ..	Director of Wireless Department of the Navy: Captain, R.N.	Horten (Navy Yard)
Mr. F. Bugge ..	Inspector Wireless Department of the Navy: Lieutenant, R.N.	Horten (Navy Yard)

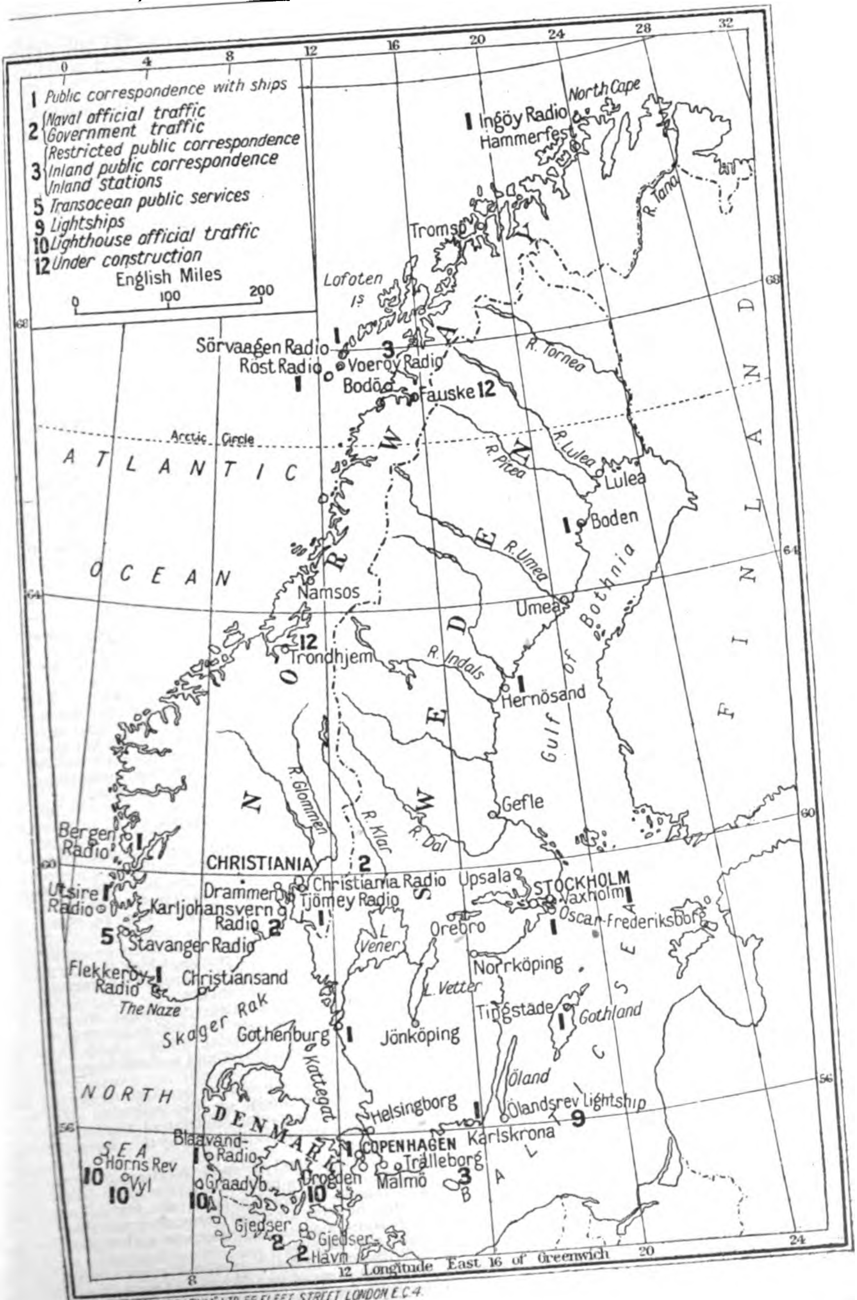
ORGANISATION.

The first wireless stations to be erected and opened for public correspondence were those at Sörvaagen and Röst, both completed in 1906. Radiotelegraphic communication was established in 1911 between Norway and Spitsbergen, and has been maintained ever since. The important transatlantic long distance station at Stavanger is now completed, whilst at Christiania another high-power installation has been erected for communication with the northern part of the country and abroad.

The latest available statistics enumerate:

Stations for public service to ships	7
Stations for Government traffic only	2
Stations for public restricted service	2
Stations for Transatlantic public traffic	1
Stations under construction	3
Installations on Norwegian merchant vessels ...	about 150

A new Norwegian company has recently been formed under the title of " Norsk Marconi Kompani A/S." This company is working in conjunction


1 Public correspondence with ships
2 Naval official traffic
Government traffic
3 Restricted public correspondence
Inland public correspondence
Inland stations
5 Transocean public services
9 Lightships
10 Lighthouse official traffic
12 Under construction
English Miles
North Cape
Ingöy Radio
Hammerfest
Tromsö
Lofoten Is
Sörvaagen Radio
Röst Radio
Voeröy Radio
Bodö
Fauske 12
Arctic Circle
ATLANTIC OCEAN
Namsos
Trondhjem
Lulea
Boden
Umea
Hernösand
Gulf of Bothnia
Gefle
Bergen Radio
CHRISTIANIA
Christiania Radio
Tjömey Radio
Drammen
Utsire Radio
Karljohansvern Radio
Stavanger Radio
Upsala
STOCKHOLM
Vaxholm
Oscar-Frederiksborg
Orebro
Norrköping
Flekkeröy Radio
Christiansand
The Naze
Skager Rak
Gothenburg
Kattegat
Jönköping
Tingstäde
Gothland
Öland
Ölandsrev Lightship
Helsingborg
Karlskrona
NORTH SEA
DENMARK
Blaavand Radio
Horns Rev
Vyl
Graadyb
Drogden
COPENHAGEN
Trälleborg
Malmö
Gjedser
Gjedser Havn
NORWAY
SWEDEN
FINLAND
BALTIC SEA
R. Tana
R. Tornea
R. Lulea
R. Pitea
R. Umea
R. Indals
R. Glommen
R. Klar
R. Dal
L. Vener
L. Vetter
Longitude East 16 of Greenwich
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with Marconi's Wireless Telegraph Co., Ltd., London, and has the sole rights of the Marconi patents for Norway. The company intends to start a factory for the manufacture of wireless apparatus, etc.

The technical manager of the new company is Commander B. Gottwaldt, of the Royal Norwegian Navy, and the commercial management is in the hands of Messrs. Storm and Bull Ltd., of Christiania.

There are at present no wireless clubs or societies.

ADMINISTRATION.

The Laws and Regulations under which wireless is administered in this country appear in the following pages in accordance with the list appended hereto:—

- **A**—Law of 24th July, 1914.
- **B**—Law of 18th August, 1914.
- **C**—Regulations.
- **D**—Ship Licence.
- **E**—Certificate for Wireless Telegraphists.
- **F**—Notice to Mariners.
- **G**—Royal Proclamation Prohibiting Wireless in Territorial Waters, dated 2nd June, 1917.

LAW OF JULY 1914.

A Law of July 24th, 1914, supplementing and amending the Law of April 29th, 1899, relating to the forwarding of communications by aid of telegraphic conductors or such like installations and relating to the repeal of Law No. 2 of July 16th, 1907:—

Section 1.—On ships which sail under the Norwegian flag and which do not belong to the Norwegian Navy, stations or installations for telegraphing or telephoning by wireless both within and without the boundaries of the Kingdom may only be installed and worked after an authorisation obtained in advance, which will be granted by the King, or whoever may be authorised thereto, on certain definite conditions for a stipulated period of time. The permission may at any time be withdrawn if the conditions imposed are not adhered to.

Detailed Rules and Regulations relating to the fitting up and working of such stations or installations shall be drawn up by the King.

On ships which sail under a foreign flag and are within Norwegian territorial waters wireless telegraphing and telephoning can only be carried on—even if they have permission for same from the authorities of the foreign country—subject to observance of the provisions which are made with respect thereto by the King or whomsoever he may have authorised for the purpose, who may, moreover, forbid all telegraphing or telephoning from such ships, whenever circumstances may be considered to require it.

Section 2.—The exceptions mentioned in the Law of April 29th, 1899, under Section 1, 2nd paragraph, relating to the working of plant which may be used by a commune or private person for his own use, or such as railways may install for their own working, shall not apply so far as the working of installations for wireless telegraphy or telephony are concerned.

Section 3.—Any infractions of the aforementioned conditions shall be punished pursuant to the provisions laid down in the Law of April 29th, 1899, Section 6.

Moreover, any transgression of the rules or provisions which are drawn up with regard to Section 1 of the present Law shall be punished by fines.

Section 4.—This Law shall come into force immediately. The Law of July 16th, 1907, containing additions and amendments to the Law of April 29th, 1899, relating to the forwarding of communications by means of telegraph lines or similar installations, is hereby repealed.

LAW OF AUGUST 1914.

B The following paragraph, taken from the "Law of August 18th, 1914," amending the Law of April 29th, 1899, relates directly to Wireless Telegraphy:—

Within the boundaries of Norway, or its territorial waters, stations and installations for wireless telegraphy and telephony may only be erected or worked after permission has been obtained from the King or whomsoever he may authorise thereto, and on such conditions as are laid down in the said permission.

REGULATIONS.

C The following regulations are based on the Law of July 24th, 1914:—

1. No radiotelegraphic station on board a foreign vessel within the limits of Norwegian territorial waters can be used without a special licence.

Application for such licence must be made to the Ministry of Telegraphs, which Ministry, after consultation with the Ministry of Marine, will decide on the application.

2. The licence granting the right to use wireless telegraphic stations within the radius of Norwegian territorial waters may be limited to definite places and to fixed hours of the day.

Wireless transmission of messages must be stopped immediately on the order of the Ministry of Telegraphs, Ministry of Marine, or of any coast station established by the aforesaid Ministries.

3. If the vessel is in a Norwegian port situated within a radius of 5 kilometres from the nearest telegraph station, the station on board the vessel cannot communicate either with Norwegian coast stations or with foreign coast stations.

Without a special licence, a wireless station on board a vessel in a Norwegian port cannot be used for the exchange of messages with

other ship stations, unless for the purpose of advising accidents.

4. However, the preceding provisions do not apply to foreign ships of war, as far as the interchange of messages between themselves is concerned.

It is the duty, nevertheless, of stations on board foreign warships to conform to the provisions in Article 2, Paragraph 2, above.

5. If a station is used when a ship is in Norwegian territorial waters this station must conform to the provisions of the International Telegraphic Convention and the regulations appended thereto.

NORWEGIAN LICENCE CONDITIONS.

D *Conditions for erection and working of Radiotelegraph and Radiotelephone stations on board ships (ship-stations).*

Form of Licence.

According to the Law of 24th July, 1914, and the Royal Decree of the 30th August, 1913, permission is hereby given to..........
....
to erect and work on board the ship..........
a Radiotelegraph Station (Radiotelephone Station) in accordance with the Table of Particulars on the last page of this form. The permission is valid from..................to
.... and is given on the following conditions.

1. The station shall belong to the..........
class of stations as specified in the International Radiotelegraph Convention Service Regulations, Art. XIII b, and will thus have........
................service.

2. The installation shall be effected in every respect in accordance with the installation plan approved by the Telegraph Department, and must not be departed from without the agreement of the said department. Ships belonging to the 1st and 2nd classes must be provided with emergency Radiotelegraph installations, as laid down in the existing Radiotelegraphic Service Regulations.

3. The holder of the licence shall, as far as the erection and working of the station is concerned, be under the obligation in every respect to adhere to existing international agreements with annexed regulations concerning Radiotelegraphy and Telephony when such International Agreements have been adhered to by Norway, and further he shall abide by such regulations as may be issued by the Department for Public Works or by the Telegraph Department.

4. The Telegraph Department shall have the right, in the interests of the service and (after conferring with the Naval Department) to require any alterations to be made in the wave lengths employed as given in the above-mentioned Table of Particulars within the limits laid down in the regulations either as a temporary or permanent measure in the working of the station.

5. The holder of the licence shall recognise the importance of keeping the station in the best possible condition in order to ensure good working.

6. The station shall be under the obligation to forward telegrams to and from persons on board, with due regard to existing general rules for such work. Further, the station shall be obliged to communicate with other ship or coast stations without regard to the system of apparatus employed at those stations.

7. The answering of signals from ships in distress and the correspondence caused thereby shall have priority over all other correspondence.

8. During the ship's stay in a Norwegian Port the station must not be used for communication either with Norwegian or with Foreign coast stations. Neither shall the station, while the ship is in a Norwegian port, be used for communication with other ship stations without special permission, or unless such communication is effected with a view to prevent accidents. Special permission is granted by the Telegraph Department after conferring with the Naval Department.

9. The call signal of the station is..........

10. The tax due to the ship station is......
......(ore) (.............. centimes) per word with a minimum of ....(ore) (............ centimes) per message.

11. The service on board must be performed by one telegraphist, or, for ship stations of Class I, by two or more telegraphists holding a certificate issued by the Telegraph Department.

This certificate states that the telegraphist concerned possesses the knowledge and abilities as prescribed in the existing International Regulations.

The granting of such certificate depends upon the passing of an examination arranged by the Telegraph Department. Petty Officers and Seamen belonging to the Navy's staff of mechanics, and who are specially trained as Radiotelegraphists for the Navy, are entitled to such certificate when they can prove to the Telegraph Department that they have the necessary knowledge of the handling of telegrams and when they procure from the authority concerned in the Navy, a testimonial to the effect that they satisfy the International Regulations as far as their knowledge of the instruments, ability, etc., is concerned. Without the permission of the Telegraph Department other than Norwegian subjects must not be employed for the service on board.

The holder of the licence will take the best possible care that the contents of messages do not come to the knowledge of unauthorised persons.

The telegraphist will make the usual promise of secrecy.

12. The holder of the licence is responsible for the charges that are due for the transmission of the messages sent from the ship station, including the charge for the coast station.

The Telegraph Administration, on its side, pays to the holder of the licence the charges that are due to the ship station for the messages addressed to the ship. "Journals" (abstract) should be kept in respect of the correspondence (traffic). These "Journals," together with the originals of the transmitted messages and such other documents as may be required, are to be sent to the Telegraph Department, as far as possible, at the end of each month.

The mutual settlement of the charges will take place quarterly or monthly, as may be arranged between the Telegraph Department and the holder of the licence. However, with the agreement of the Telegraph Department the holder of the licence may make other arrangements for the accounting of stations on ships that are exclusively engaged in Foreign Waters. Such arrangements may be made with the Administrations to which the coast stations that the ships usually make use of belong. Similarly, the Telegraph Department may make arrangements other than those

mentioned above with Foreign Administrations.

13. The station is subject to such supervision as may be decided by the Department for Public Works, and one or more of the Officials appointed by the Department for Public Works or by the Telegraph Department should be given opportunity to inspect the station.

For the supervision of the station the holder of the licence has to pay a certain fee that will be decided by the Department.

14. When State or other public reasons so demand it, the Department for Public Works or the Naval Department may partly or entirely prohibit the transmission of any kind of traffic correspondence at the station without admitting any claim for compensation. Likewise, in the interests of the service, the Telegraph or Naval Department can prohibit with the same effect all correspondence from the station, either at certain places or at certain times of the day.

15. The Norwegian State has the right to take over the station with six months' notice against compensation, the amount of which will be fixed after valuation, should it not be possible to arrive at an amicable adjustment. The valuation will be made by a Committee of three members, whereof one member is nominated by the owner, one by the Telegraph Department and one by the Department for Public Works.

The member nominated by the Department for Public Works will be the Chairman of the Committee.

The questions put before the Committee will be decided solely by majority of votes.

In case the owner has not, within thirty days after the reception of the invitation, made any such nomination as mentioned above, or in case the member nominated by him fails to attend, the valuation will then with obligatory effect be decided by the other nominees.

In case of equal voting the vote of the Chairman shall decide the matter.

In the valuation regard shall only be paid to the technical value of the station at the moment of valuation, the income, etc., derived from the station not being taken into account.

The valuation shall take place within a time-limit fixed by the Telegraph Department and will be at the public expense.

16. The licence shall become null and void in case :—

(*a*) Use is not made of it within a year of its issue.

(*b*) Breach is made of any of its regulations.

(*c*) The ship ceases to fly the Norwegian flag.

17. Disputes as to the intent and meaning of this licence shall, with obligatory effect, be decided by the King.

The Telegraph Department,

CHRISTIANIA..............19

....

SCHEDULE.

System.	Type of Installation.	Normal range (by day).	Wave-lengths (the normal wave to be underlined).	Description of Power Supply.	Description of Transmitting and Receiving Instruments. (Detailed sketch of connections attached.)	Type of Aerial (Sketch with measurements attached).	Description of Emergency Gear (for ship stations of 1st and 2nd classes. Detailed sketch of connections attached).	Remarks

CERTIFICATE.

It is hereby testified, that........ ....has in a satisfactory manner stood the test for radio telegraphists, ordered by the Telegraph Administration, comprising :—

(*a*) Management of apparatus, and knowledge of their action.

(*b*) Transmitting and receiving by the ear with the speed ordered for a certificate of .... Class.

(*c*) Regulations.

With reference to above, and as.......... has made the promise of secrecy fixed for telegraph officials, there is hereby given to .... a certificate of .... Class, as radiotelegraphist on board ships.

The Telegraph Administration, Kristiania, the...................

NOTICE TO MARINERS.

The State Telegraph Department issued in December, 1908, the following "Notice to Mariners" applying to wireless telegraph equipments on board ships in Norwegian territorial waters :—

1. Wireless telegraph or wireless telephone stations on board foreign vessels must not be operated, except by special permission, within Norwegian territorial waters. Requests for such permission must be sent to the Telegraph Department, which will communicate its decision after conference with the Marine Department.

2. Permission to operate the stations on board foreign vessels within Norwegian territorial boundaries may be restricted to certain fixed places, or to certain fixed periods of the 24 hours. Correspondence by means of the wireless apparatus shall be at once sus-

pended whenever it shall be so desired by the Telegraph Department, the Marine Department, or by any one of the coast stations under their authority.

3. During the stay of a vessel in a Norwegian harbour, within a distance of 5 kilometres (3 miles) from the nearest telegraph station, the station on board a foreign vessel must not be employed for telegraphing either with Norwegian or foreign coast stations. Without special permission, the station during a vessel's stay in a Norwegian harbour must not be employed for communicating with other ship stations except for the purpose of preventing accidents.

4. The regulations above mentioned do not, however, apply to stations on board vessels of war belonging to foreign powers, which carry on mutual correspondence. Such stations are, however, bound to submit themselves to the regulations contained in the second clause of Section 2.

5. Whenever the station on board a foreign vessel is employed during her stay in Norwegian territorial waters, this shall be done subject to the regulations contained in the International Telegraph Convention, with the rules pertaining thereto.

PROHIBITION AGAINST THE USE OF WIRELESS TELEGRAPH IN NORWEGIAN TERRITORIAL WATERS.

Pursuant to Act of July 24th, 1914, the following is ordained :—

1. All use of wireless telegraph from ships of belligerent powers is forbidden in Norwegian ports, the whole area of the naval ports included. Such ships as mentioned are therefore during their stay in such ports to have their aerials (antenna) lowered and, if required by the authorities, to have their wireless stations sealed.

2. In Norwegian territorial waters the use of wireless telegraph from ships of belligerent powers is likewise generally forbidden. Merchant vessels of belligerent powers shall therefore, while trafficating Norwegian territorial waters, have their aerials (antenna) lowered and, if required by the authorities, have their wireless stations sealed.

3. In Norwegian ports, the whole area of the naval ports included, all use of wireless telegraph from Norwegian merchant vessels and foreign merchant vessels of non-belligerent powers is forbidden, unless it be done in order to prevent disasters. The authorities may, if it be considered desirable, also subject such ships to further restrictions, require their aerials (antenna) lowered and their wireless stations sealed.

Order to control that these provisions are observed by all concerned is issued to Norwegian warships, naval and military authorities, pilotage, customs, harbour and police authorities, as well as by pilots serving on board of such vessels as above mentioned.

Infringements are liable to punishment.

K. FR. DAWES,
Admiral Commander-in-Chief,
K. OSTBYE.

Kristiania, June 2nd, 1917.

NYASALAND PROTECTORATE

(See map on p. 364.)

THIS Colony was constituted on May 14th, 1891, as the "British Central Africa" Protectorate, and so remained until 1907, when it assumed its present appellation. Its area covers 39,573 square miles, the trade centres being Port Herald, Chiromo (Lower-Shiré), Kota-Kota, Karonga, and Fort-Johnston (Lake Nyasa). Communication is maintained by river steamer with the port of Chinde on the Indian Ocean littoral.

It is administered (under the Colonial Office) by the Governor and Commander-in-Chief, assisted by an Executive and an Administrative Council.

ADMINISTRATION.

Wireless Telegraphy is regulated under the following Act :—

WIRELESS ORDINANCE, 1908.

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance," 1908.

2. No person shall establish or use any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

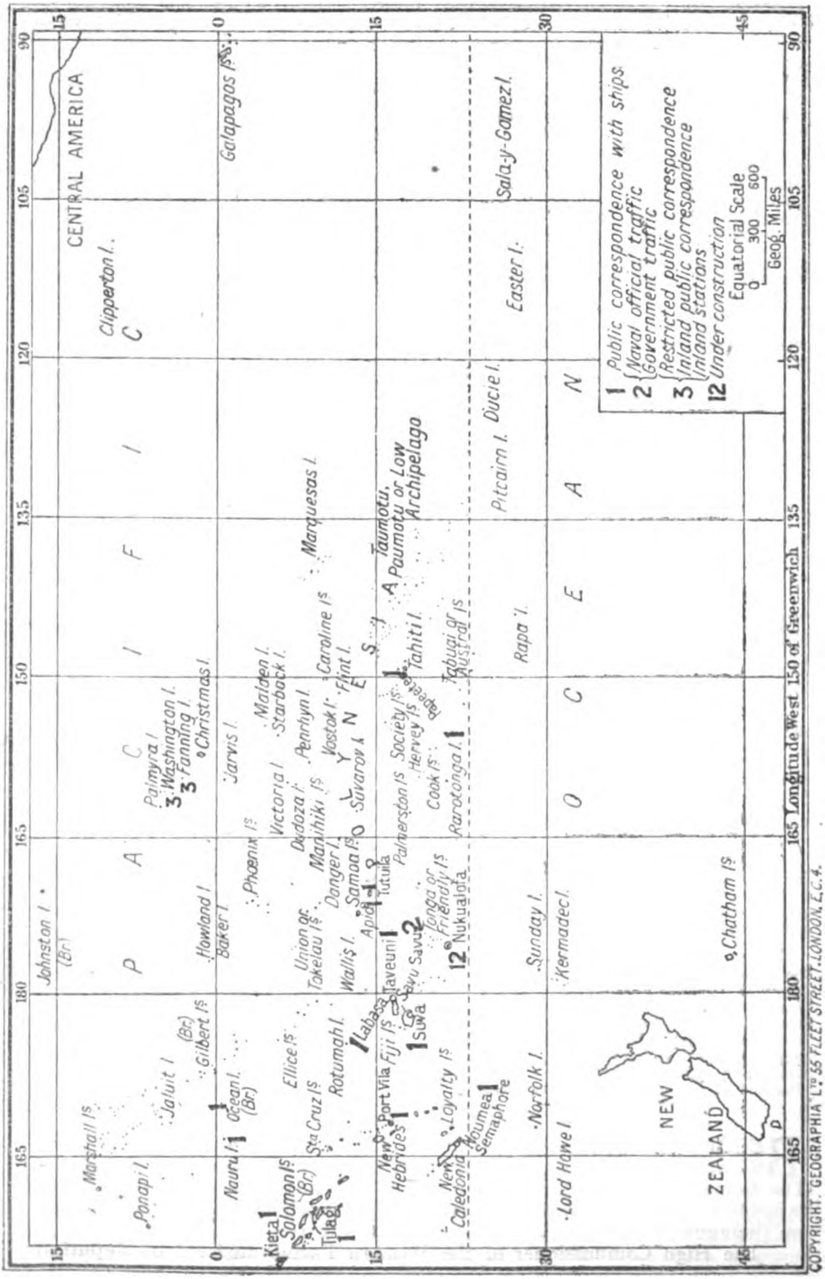
Any person contravening this section shall be liable on conviction to a fine not exceeding £100 or to imprisonment with or without hard labour for a term not exceeding twelve months with or without the option of a fine, and in addition any apparatus or installations in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. The Governor in Council may from time to time make, and when made shall publish in the *Gazette*, rules prescribing the terms and conditions upon which licences to establish or use apparatus or installations for the purpose of operating wireless telegraphs may be granted, and may impose a penalty on conviction for breach of any rules so made of a fine not exceeding £50 or imprisonment with or without hard labour for a term not exceeding six months with or without the option of a fine, and such Rules may further provide for forfeiture and sale or disposal as the Governor may direct of any such apparatus or installations as aforesaid.

PACIFIC ISLANDS

BEFORE the war, the islands in the Pacific were divided with regard to European supervision between Germany, France, and Great Britain. The former has now disappeared completely from the Pacific. It is not yet possible to include particulars concerning the French spheres of influence, and we therefore for the present confine ourselves to the British.

The High Commissioner of the Western Pacific (assisted by deputies)


CENTRAL AMERICA
P A C I F I C
O C E A N
NEW ZEALAND
1 Public correspondence with ships
2 {Naval official traffic / Government traffic
3 {Restricted public correspondence / Inland public correspondence / Inland stations
12 Under construction
Equatorial Scale
0 300 600
Geog. Miles
165 Longitude West 150 of Greenwich
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exercises jurisdiction, in accordance with an Order in Council of 1893, for the purpose of carrying out the provisions of the Pacific Islanders' Protection Acts of 1872 and 1875, and to settle disputes between British subjects living in these islands. The authority of the High Commissioner extends over all the Western Pacific not within the limits of Fiji, New Zealand, Queensland, or New South Wales, or the jurisdiction of any civilised power, and includes the Southern Solomon Islands and the various small groups in Melanesia.

The New Hebrides are ruled under the joint administration of British and French officials, in accordance with the Anglo-French Convention of 1906.

The principal groups consist of the British Solomon Islands, the Gilbert and Ellice Islands, the Tonga or Friendly Islands, the Phœnix Islands, Pitcairn Islands, and the New Hebrides.

Of these only Fanning Island (which under an Order in Council of 27th January, 1916, was included in the Gilbert and Ellice Colony) is connected by cable with the rest of the world.

With regard to the other islands, the only telegraphic communication is by means of wireless, and we are able to print below the Wireless Regulations in force in the Gilbert and Ellice Colony, wherein the centre of administration (at Ocean Island) is able to exchange official and public correspondence with Nauru, Tulagi and Apia. We also print regulations promulgated by the joint administration of the New Hebrides.

GILBERT AND ELLICE COLONY

THIS group comprises 31 islands, with a number of islets depending upon them, and lies between latitude 4° N. and 10° S.; its longitude being 169° E. to 158° W. The total area approximates to 200 square miles. Out of a population of about 32,000, four hundred are Europeans, and three hundred and fifty Asiatics, the remainder being Polynesians and Micronesians.

The Government Headquarters are located at Paanopa, Ocean Island, which is also the scene of important operations by the Pacific Phosphate Company.

CONTROL AND ORGANISATION.

Radiotelegraphy is a Government monopoly, though licences may be granted for private erection and working. There are at present three Government land stations for public service. The first station, a 5-kw. Marconi set, was installed at Ocean Island at the end of 1915.

ADMINISTRATION.

The following are the rules and regulations at present in force :—

A—King's Regulation No. IX. of 1912.
B—Rules under the provisions thereof.

KING'S REGULATION No. IX. OF 1912.

TO GOVERN THE USE OF WIRELESS TELEGRAPHY IN THE WESTERN PACIFIC.

A 1. This regulation may be cited as "The Wireless Telegraphy Regulation, 1912."

2. The Wireless Telegraphy Regulation, 1907, is hereby repealed.

3. (1) It shall not be lawful for any person to establish, instal or use any apparatus for the purpose of electrical communication by means of wireless telegraphy in any protectorates, islands, or places within the jurisdiction of the High Commissioner for the Western Pacific specified in the schedule hereto without a licence to do so first obtained from the said High Commissioner.

(2) A licence under this section shall be subject to such terms and conditions as may be prescribed by any rules made under this regulation, and to such other terms and conditions as the High Commissioner may from time to time prescribe.

4. The High Commissioner may make rules from time to time to carry out the provisions of this regulation and in particular to regulate the use of apparatus for wireless telegraphy on board merchant ships, whether British or foreign vessels, while in the territorial waters of the protectorates or islands or places aforesaid.

5. Any person who contravenes the provisions of this Regulation or of any rules made hereunder, or fails to observe and perform the terms and conditions of a licence granted by the High Commissioner hereunder or prescribed by any rules aforesaid, shall be liable to a penalty not exceeding one hundred pounds and to the forfeiture of any apparatus established, installed or used for the purpose aforementioned.

6. This Regulation shall not apply to the islands of the Pacific Ocean known as the New Hebrides, including the Banks Islands and Torres Islands.

SCHEDULE.

The British Solomon Islands Protectorate

The Gilbert and Ellice Islands Protectorate, The Union (Tokelau) Islands, The Phœnix Islands, Fanning Island, Washington Island, Christmas Island and all other islands in the Western Pacific not being within the jurisdiction of the Commonwealth of Australia or any of the states thereof or of the Dominion of New Zealand or of any civilised Power.

B Rules to Regulate the Use of Wireless Telegraph Apparatus on Merchant Ships in the Western Pacific made by the High Commissioner under the Provisions of the Wireless Telegraphy Regulation, 1912.

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the protectorates, islands, and places specified in the schedule to the Wireless Telegraphy Regulation, 1912, shall be worked in such a way as not to interfere with (*a*) naval signalling; and (*b*) the working of any wireless telegraph station lawfully established installed or worked in those protectorates, islands or places or the territorial waters thereof; and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while that ship is in any of the harbours of the protectorates, islands and places aforesaid except with the special or general permission of the Resident Commissioner or other Chief Executive Authority therein.

3. If at any time in the opinion of the High Commissioner an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters aforesaid shall be subject to such further rules as may be made by the High Commissioner from time to time, and those rules may prohibit or regulate that use in all cases or in such cases as may be deemed desirable.

4. These rules shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

NEW HEBRIDES

THE New Hebrides consist of four groups of islands, the Banks, Torres, Central, and Southern, lying between 12° and 20° south latitude and 165° and 170° east longitude. The four groups, which have an estimated area of 5,500 square miles, comprise some fifty to sixty islands, large and small, of which the largest are Santo (Espiritu Santo), Malekula, and Efate. The islands are administered by a condominium established under a Convention between Great Britain and France, signed on October 20th, 1906, each country being represented by a Resident Commissioner. The seat of Government is at Vila, in the island of Efate. The laws of the two nations apply to their respective nationals in the group, as also such joint regulations as may be passed by the Resident Commissioners, or the High Commissioners for Great Britain and France under the authority of the Convention referred to. Natives are subject to regulations similarly enacted.

CONTROL AND ORGANISATION.

An agreement was arrived at in 1913 between the British and French Governments to establish a wireless telegraph station in the New Hebrides at the joint expense of the two Governments. In March, 1915, a contract was entered into with the Société Française Radio-électrique for the erection of such a station at Vila on the island of Efate. In October, 1915, the engineer and operator, together with the material, arrived at Vila, and on September 1st, 1916, the installation was completed, and the station opened to the public.

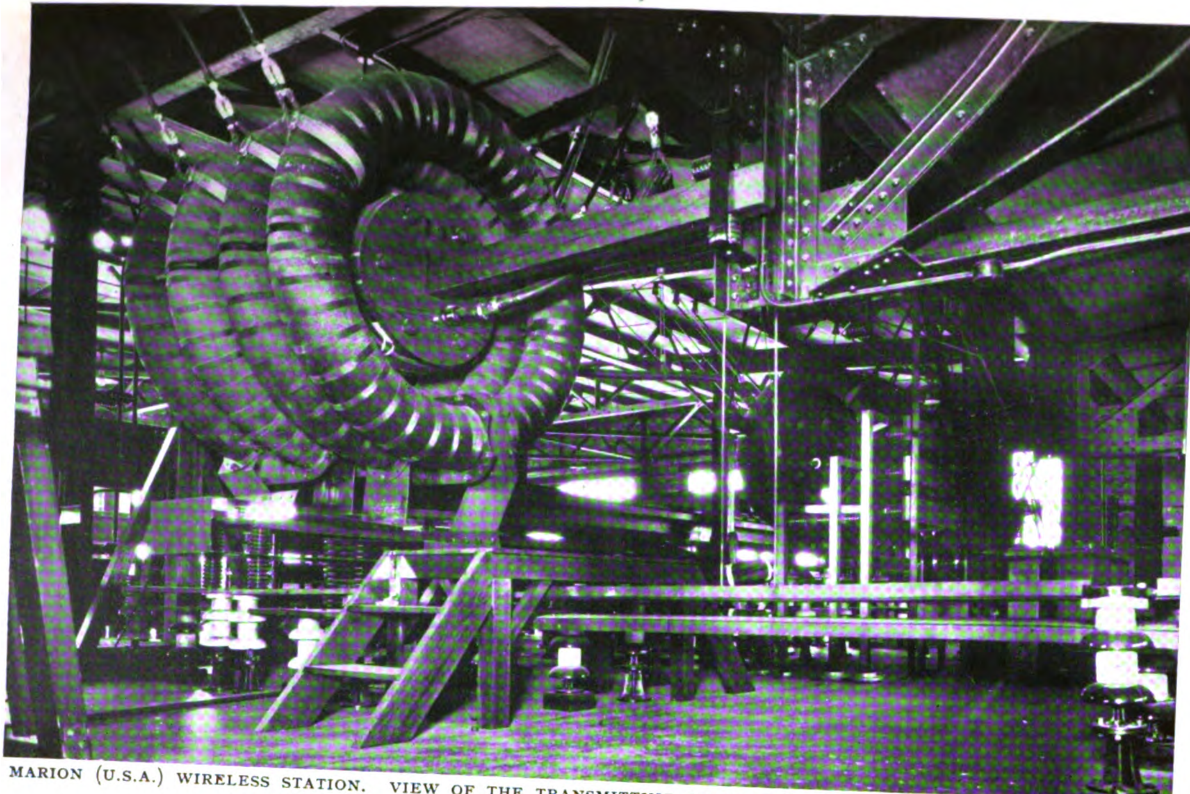
Wireless telegraphy in the New Hebrides is practically a State monopoly. No provision is made for licences for private installations, which are prohibited, except with the permission of the administration. The Resident Commissioners are responsible for the control of radiotelegraphic activity in the islands. The only station at present is the land station of Vila, which is directly controlled by Government and is open for public service to ships.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
M. King	H.B.M. Resident Commissioner	Vila
Marcel Courtois	Officer in charge wireless station and sole operator	Do.

ADMINISTRATION.

There are no firms or companies engaged in the manufacture of wireless apparatus, and no wireless societies or clubs.



MARION (U.S.A.) WIRELESS STATION. VIEW OF THE TRANSMITTING JIGGER AND OF THE MAIN CONDENSER BUSBARS.

[To face page 336

Two joint regulations affecting wireless telegraphy have been issued by the Condominium administration, the first dated January 7th, 1909, No. 1, "The Wireless Telegraph Regulation, 1909," the other the "Wireless Telegraph (Ships) Regulation, No. 3, of 1916."

The texts of these appear below.

A—Regulation dated 1909.

B—Wireless Telegraph (Ships) Regulation, 1916.

A JOINT REGULATION TO REGULATE THE INSTALLATION OF WIRELESS TELEGRAPHY IN THE NEW HEBRIDES.

A 1. From the date of the passing of this regulation it shall be unlawful for any person to use or establish in any of the islands of the New Hebrides, including the Banks and Torres Islands, any apparatus or installation for the purpose of electrical communication by wireless telegraphy without a licence first obtained from the Resident Commissioners conjointly such licence to be granted on such terms and conditions as the Resident Commissioners aforesaid may from time to time determine.

2. Any person offending against the provisions of the preceding section or failing to comply with the terms and conditions of a licence when granted by the Resident Commissioners under the provisions of this Regulation shall be liable to a penalty not exceeding twenty pounds and to forfeit any apparatus used or established for the purpose aforementioned.

3. Offences against this regulation shall be justiciable by the Joint Court contemplated by the Tenth Article of the Anglo-French Convention of the twentieth day of October one thousand nine hundred and six and pending the establishment of such court by the court of the nation to which or to whose legal system the accused may belong.

4. This regulation may be cited as "The Wireless Telegraphy Regulation, 1909."

Published and exhibited at the Public Offices of the Resident Commissioners for His Britannic Majesty and for the French Republic this seventh day of January in the year one thousand nine hundred and nine.

A JOINT REGULATION TO CONTROL THE USE OF WIRELESS TELEGRAPH APPARATUS ON MERCHANT VESSELS IN THE NEW HEBRIDES.

B 1. From the date of the passing of this regulation all apparatus for wireless telegraphy on board merchant ships in the territorial waters of the New Hebrides shall be worked in such a way as not to interfere with:

(a) Naval signalling;

(b) The working of any wireless telegraph station lawfully established, installed or worked in the New Hebrides or the territorial waters thereof; and

(c) The transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraph on board a merchant ship shall be worked or used while the ship is in any of the harbours of the New Hebrides except with the joint special or general permission of the Resident Commissioners.

3. The Resident Commissioners shall have power to issue such further rules as to them may seem expedient for the control of wireless telegraphy on merchant vessels and for the censorship of messages transmitted from such vessels while in the territorial waters of the Group.

4. Any infraction of this regulation shall be punishable by the Joint Court with a money penalty of from one to twenty pounds and imprisonment for one day to one month or with one or other of these penalties.

5. This Regulation may be cited as the "Wireless Telegraph (Ships) Regulation, 1916."

Published and exhibited in the Public Offices of the Resident Commissioners for Great Britain and the French Republic, at Vila, in the New Hebrides, this 30th day of October, 1916.

TONGA ISLANDS.

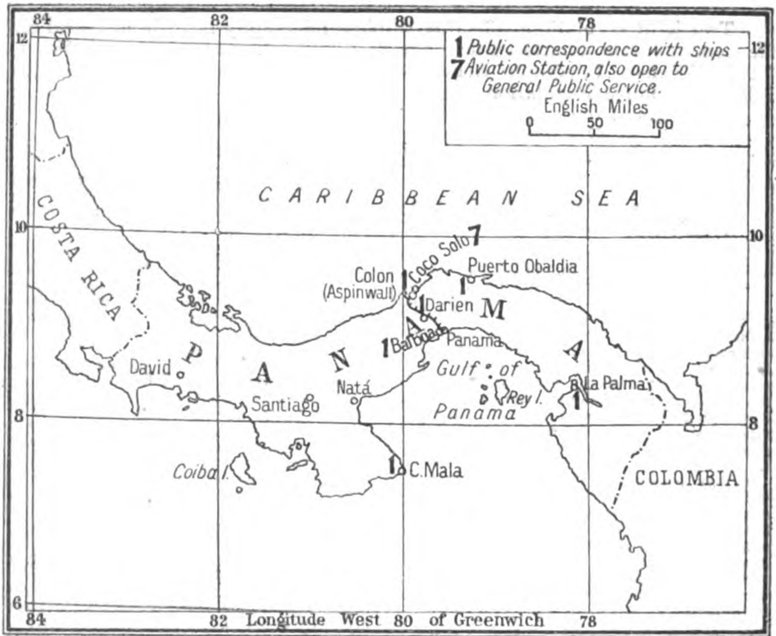
LACK of means of rapid communication with the outside world has severely handicapped traders, growers and other residents of the Tongan group of islands.

Their long term of isolation will soon be ended, for, in the near future, direct wireless communication is to be established between Nukualofa and Suva (Fiji Islands).

The entire apparatus, which includes the latest magnifying valve receivers, power plant, storage batteries, and specially designed masts, will be manufactured by Amalgamated Wireless (Australasia), Ltd., at that company's works in Sydney, and erected by Australian engineers.

PANAMA (CANAL ZONE)

THE idea of a Canal through the Isthmus of Panama originated with a Spanish engineer in 1530. Monsieur de Lesseps laboured on its construction from 1882 to 1894, when the United States Government took over the undertaking. This action of the U.S.A. followed closely on the establishment of a separate Republic of Panama (a secession from the U.S. of Colombia),



which took place on November 23rd, 1903. The American Canal was opened for traffic on August 15th, 1914.

The American-controlled zone consists of a strip of land 10 miles in width, extending across the Isthmus a distance of 50 miles. The rights of sovereignty are vested in the U.S.A. under a treaty signed on February 26th, 1904.

The Zone is ruled by a Governor, who reports through the Secretary of War to the President and conducts the government according to the authority invested in him by Acts of Congress and Executive orders. In periods of crisis or times of war the supreme command is vested in the Commanding Officer of the Troops, designated as the Panama Canal Department of the U.S.A. Army.

CONTROL.

Radiotelegraphy in the Zone is administered by the Navy Department of the United States. All wireless stations on the Isthmus are under control of the Commandant, 15th Naval District, Balboa Heights, Canal Zone, and under the immediate supervision of the Communication Superintendent, 15th Naval District.

Under agreement between the Republic of Panama and the United States of America Radiotelegraphic Communication within the Republic, as well as in the Canal Zone, remains under the control of the U.S.A. This arrangement rests on Decree No. 130 of August 29th, 1914, signed by the President of the Panama Republic.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official	*Title.*	*Address.*
Capt. L. R. Sargent, U.S.N. ..	Marine Superintendent Panama Canal and Commandant 15th U.S. Naval District	Balboa Heights
Lt.-Com. F. L. Riefkohl.. ..	Communication Superintendent 15th U.S. Naval District	Balboa Radio Station, Fort Amador

ORGANISATION.

The first radio station erected was situated in the Republic of Panama within the municipal limits of the City of Colon, in 1906, and the reservation there established is still the site of a successor to this pioneer station.

The small station established at Porto Bello, Panama, in 1909 was closed on May 13th, 1914. The Colon station, established on March 1st, 1910, was re-equipped with improved apparatus, and opened to commercial traffic in January, 1913. At Balboa (Pacific end of the Canal) there stands a station opened for commercial business in June, 1913, and replaced by an improved installation on the same site in 1914. The well-known "Darien" station (located alongside the Canal, midway between the oceans) is a high-power installation, designed primarily for communication with Washington and for naval vessels at sea. It possesses a sending radius of 3,000 miles, and was placed in regular service on April 5th, 1915.

There is a Naval Radio Station for communication with aircraft at the Naval Air Station, Coco Solo, C.Z. It is contemplated to instal a radio telephone transmitter at that station some time in the near future, which will be available for use in handling commercial traffic. No definite information is available as to the time when this set will be installed.

There have been some developments not shown above, but no information concerning them has yet been disclosed.

There are no wireless clubs or radio societies, the whole of the wireless operations being controlled and administered by the U.S. Navy.

An unofficial news service for the benefit of persons at sea is carried on by the Colon station, which each day at 3.30 p.m. radiates broadcast about 200 words of news made up of extracts from the Panama morning papers, whilst Press despatches obtained by radio from the United States are re-broadcasted at 5 a.m. by Balboa (NBA) on 7,000 metres (arc) and 2,400 metres spark.

ADMINISTRATION.

We publish below the text of the various Acts and Decrees affecting radiotelegraphy in the Canal Zone in accordance with the following list :—

A—Act to Regulate Radio Communication issued August 13th, 1912.
B—Section 6 of Act to Provide for Opening, Maintenance, Protection, and Operation of the Panama Canal (dated August 24th, 1912).
C—Extracts from Rules and Regulations for the Operation and Navigation of the Panama Canal dated August 15th, 1919.
D—Notice concerning Commercial Service at Naval Stations dated September 1st, 1913.
E—Circular *re* Compulsory Wireless dated July 23rd, 1914.
F—Circular *re* Free Radio Service dated November 17th, 1914.

AN ACT TO REGULATE RADIO COMMUNICATION.

A Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a person, company, or corporation within the jurisdiction of the United States shall not use or operate any apparatus for radio communication as a means of commercial intercourse among the several States, or with foreign nations, or upon any vessel of the United States engaged in interstate or foreign commerce, or for the transmission of radiograms or signals the effect of which extends beyond the jurisdiction of the State or Territory in which the same are made, or where interference would be caused thereby with the receipt of messages or signals from beyond the jurisdiction of the said State or Territory, except under and in accordance with a licence, revocable for cause, in that behalf granted by the Secretary of Commerce and Labour upon application therefor; but nothing in this Act shall be construed to apply to the transmission and exchange of radiograms or signals between points situated in the same State: Provided, that the effect thereof shall not extend beyond the jurisdiction of the said State or interfere with the reception of radiograms or signals from beyond said jurisdiction; and a licence shall not be required for the transmission or exchange of radiograms or signals by or on behalf of the Government of the United States, but every Government station on land or sea shall have special call letters designated and published in the list of radio stations of the United States by the Department of Commerce and Labour. Any person, company, or corporation that shall use or operate any apparatus for radio communication in violation of this section, or knowingly aid or abet another person, company, or corporation in so doing, shall be deemed guilty of a misdemeanour, and on conviction thereof shall be punished by a fine not exceeding five hundred dollars, and th

apparatus or device so unlawfully used and operated may be adjudged forfeited to the United States.

SEC. 2.—That every such licence shall be in such form as the Secretary of Commerce and Labour shall determine and shall contain the restrictions, pursuant to this Act, on and subject to which the licence is granted; that every such licence shall be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico, and shall specify the ownership and location of the station in which said apparatus shall be used and other particulars for its identification and to enable its range to be estimated; shall state the purpose of the station, and, in case of a station in actual operation at the date of passage of this Act, shall contain the statement that satisfactory proof has been furnished that it was actually operating on the above-mentioned date; shall state the wave-length or the wave-lengths authorised for use by the station for the prevention of interference and the hours for which the station is licensed for work; and shall not be construed to authorise the use of any apparatus for radio communication in any other station than that specified. Every such licence shall be subject to the regulations contained herein, and such regulations as may be established from time to time by authority of this Act or subsequent Acts and treaties of the United States. Every such licence shall provide that the President of the United States in time of war or public peril or disaster may cause the closing of any station for radio communication and the removal therefrom of all radio apparatus, or may authorise the use or control of any such station or apparatus by any department of the Government, upon just compensation to the owners.

SEC. 3.—That every such apparatus shall at all times while in use and operation as aforesaid be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce and Labour. Every person so licensed who in the operation of any radio apparatus shall fail to observe and obey regulations contained in or made pursuant to this Act or subsequent Acts or treaties of the United States, or any one of them, or who shall fail to enforce obedience thereto by an unlicensed person while serving under his supervision, in addition to the punishments and penalties herein prescribed, may suffer the suspension of the said licence for a period to be fixed by the Secretary of Commerce and Labour not exceeding one year. It shall be unlawful to employ any unlicensed person or for any unlicensed person to serve in charge or in supervision of the use and operation of such apparatus, and any person violating this provision shall be guilty of a misdemeanour, and on conviction thereof shall be punished by a fine of not more than one hundred dollars or imprisonment for not more than two months, or both, in the discretion of the court, for each and every such offence: Provided, that in case of emergency the Secretary of Commerce and Labour may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of June twenty-fourth, nineteen hundred and ten.

SEC. 4.—That for the purpose of preventing or minimising interference with communication between stations in which such apparatus is operated, to facilitate radio communication, and to further the prompt receipt of distress signals, said private and commercial stations shall be subject to the regulations of this section. These regulations shall be enforced by the Secretary of Commerce and Labour through the collectors of customs and other officers of the Government as other regulations herein provided for.

The Secretary of Commerce and Labour may, in his discretion, waive the provisions of any or all of these regulations when no interference of the character above mentioned can ensue.

The Secretary of Commerce and Labour may grant special temporary licences to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave-lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations.

In these regulations the naval and military stations shall be understood to be stations on land.

REGULATIONS.

1. *Normal Wave-Length.*—Every station shall be required to designate a certain definite wave-length as the normal sending and receiving wave-length of the station. This wave-length shall not exceed 600 metres or it shall exceed 1,600 metres. Every coastal station open to general public service shall at all times be ready to receive messages of such wave-lengths as are required by the Berlin Convention. Every ship station, except as hereinafter provided, and every coast station open to general public service shall be prepared to use two sending wave-lengths, one of 300 metres and one of 600 metres, as required by the international convention in force: Provided, that the Secretary of Commerce and Labour may, in his discretion, change the limit of wave-length reservation made by regulations 1 and 2 to accord with any international agreement to which the United States is a party.

2. *Other Wave-Lengths.*—In addition to the normal sending wave-length all stations, except as provided hereinafter in these regulations, may use other sending wave-lengths: Provided, that they do not exceed 600 metres or that they do exceed 1,600 metres: Provided further, that the character of the waves emitted conforms to the requirements of regulations 3 and 4 following.

3. *Use of a "Pure Wave."*—At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave-lengths, more or less sharply defined, as indicated by a sensitive wave-metre, the energy in no one of the lesser waves shall exceed 10 per cent. of that in the greatest.

4. *Use of a "Sharp Wave."*—At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

5. *Use of "Standard Distress Wave."*—Every station on shipboard shall be prepared to send distress calls on the normal wave-length designated by the international con-

vention in force, except on vessels of small tonnage unable to have plants insuring that wave-length.

6. *Signal of Distress.*—The distress call used shall be the international signal of distress :—

● ● ● ▬ ▬ ▬ ● ● ●

7. *Use of "Broad Interfering Wave" for Distress Signals.*—When sending distress signals, the transmitter of a station on shipboard may be tuned in such a manner as to create a maximum of interference with a maximum of radiation.

8. *Distance Requirement for Distress Signals.*—Every station on shipboard, wherever practicable, shall be prepared to send distress signals of the character specified in regulations 5 and 6 with sufficient power to enable them to be received by day over sea a distance of 100 nautical miles by a shipboard station equipped with apparatus for both sending and receiving equal in all essential particulars to that of the station first mentioned.

9. "*Right of Way*" *for Distress Signals.*—All stations are required to give absolute priority to signals and radiograms relating to ships in distress ; to cease all sending on hearing a distress signal ; and, except when engaged in answering or aiding the ship in distress, to refrain from sending until all signals and radiograms relating thereto are completed.

10. *Reduced Power for Ships near a Government Station.*—No station on shipboard, when within fifteen nautical miles of a naval or military station, shall use a transformer input exceeding one kilowatt, nor, when within five nautical miles of such a station, a transformer input exceeding one-half kilowatt, except for sending signals of distress or signals or radiograms relating thereto.

11. *Intercommunication.*—Each shore station open to general public service between the coast and vessels at sea shall be bound to exchange radiograms with any similar shore station and with any ship station without distinction of the radio systems adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radiograms with any other station on shipboard without distinction of the radio systems adopted by each station, respectively.

It shall be the duty of each such shore station, during the hours it is in operation, to listen in at intervals of not less than fifteen minutes and for a period of not less than two minutes, with the receiver tuned to receive messages of 300 metre wave-lengths.

12. *Division of Time.*—At important seaports and at all other places where naval or military and private or commercial shore stations operate in such close proximity that interference with the work of naval and military stations cannot be avoided by the enforcement of the regulations contained in the foregoing regulations concerning wave-lengths and character of signals emitted, such private or commercial shore stations as do interfere with the reception of signals by the naval and military stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time. The Secretary of Commerce and Labour may, on the recommendation of the Department concerned, designate the station or stations which may be required to observe this division of time.

13. *Government Stations to Observe Division of Time.*—The naval or military stations for which the above-mentioned division of time may be established shall transmit signals or radiograms only during the first fifteen minutes of each hour, local standard time, except in case of signals or radiograms relating to vessels in distress, as hereinbefore provided.

14. *Use of Unnecessary Power.*—In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired.

15. *General Restrictions on Private Stations.*—No private or commercial station not engaged in the transaction of *bona fide* commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave length exceeding 200 metres, or a transformer input exceeding one kilowatt, except by special authority of the Secretary of Commerce and Labour contained in the licence of the station : *Provided*, That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third or fourth regulations to the penalties of $100 or $25, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

16. *Special Restrictions in the Vicinities of Government Stations.*—No station of the character mentioned in regulation 15 situated within five nautical miles of a naval or military station shall use a transmitting wave length exceeding 200 metres or a transformer input exceeding one-half kilowatt.

17. *Ship Stations to Communicate with Nearest Shore Stations.*—In general, the shipboard stations shall transmit their radiograms to the nearest shore station. A sender on board a vessel shall, however, have the right to designate the shore station through which he desires to have his radiograms transmitted. If this cannot be done, the wishes of the sender are to be complied with only if the transmission can be effected without interfering with the service of other stations.

18. *Limitations for Future Installations in Vicinities of Government Stations.*—No station on shore not in actual operation at the date of the passage of this Act shall be licensed for the transaction of commercial business by radio communication within fifteen nautical miles of the following naval or military stations—to wit: Arlington, Virginia ; Key West, Florida ; San Juan, Porto Rico ; North Head and Tatoosh Island, Washington ; San Diego, California ; and those established or which may be established in Alaska and in the Canal Zone ; and the head of the department having control of such Government stations shall, so far as is consistent with the transaction of governmental business, arrange for the transmission and receipt of commercial radiograms under the provisions of the Berlin convention of 1906 and future international conventions or treaties to which the United States may be a party, at each of the stations above referred to, and shall fix the rates therefor, subject to control of such rates by Congress. At such stations and wherever and whenever shore stations open for general public business

between the coast and vessels at sea under the provisions of the Berlin convention of 1906 and future international conventions and treaties to which the United States may be a party shall not be so established as to insure a constant service day and night without interruption, and in all localities wherever or whenever such service shall not be maintained by a commercial shore station within 100 nautical miles of a naval radio station, the Secretary of the Navy shall, so far as is consistent with the transaction of governmental business, open naval radio stations to the general public business described above, and shall fix rates for such service, subject to control of such rates by Congress. The receipts from such radiograms shall be covered into the Treasury as miscellaneous receipts.

19. *Secrecy of Messages.*—No person or persons engaged in or having knowledge of the operation of any station or stations shall divulge or publish the contents of any messages transmitted or received by such station, except to the person or persons to whom the same may be directed, or their authorised agent, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Any person guilty of divulging or publishing any message, except as herein provided, shall, on conviction thereof, be punishable by a fine of not more than $250 or imprisonment for a period of not exceeding three months, or both fine and imprisonment, in the discretion of the Court.

Penalties.—For violation of any of these regulations, subject to which a licence under sections 1 and 2 of this Act may be issued, the owner of the apparatus shall be liable to a penalty of $100, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any of such regulations the licence may be revoked.

For violation of any of these regulations, except as provided in regulation 19, subject to which a licence under section 3 of this Act may be issued, the operator shall be subject to a penalty of $25, which may be reduced or remitted by the Secretary of Commerce and Labour, and for repeated violations of any such regulations, the licence shall be suspended or revoked.

Sec. 5.—That every licence granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not wilfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanour, and upon conviction thereof the owner or operator, or both, shall be punishable by a fine of not to exceed $500 or imprisonment for not to exceed one year, or both.

Sec. 6.—That the expression "radio communication" as used in this Act means any system of electrical communication by telegraphy or telephony without the aid of any wire connecting the points from and at which the radiograms, signals, or other communications are sent or received.

Sec. 7.—That a person, company, or corporation within the jurisdiction of the United States shall not knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal or call or false or fraudulent signal, call, or other radiogram of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than $2,500 or imprisonment for not more than five years, or both, in the discretion of the court, for each and every such offence, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal, call, or other radiogram shall be a fine of not more than $1,000 or imprisonment for not more than two years, or both, in the discretion of the court, for each and every such offence.

Sec. 8.—That a person, company, or corporation shall not use or operate any apparatus for radio communication on a foreign ship in territorial waters of the United States otherwise than in accordance with the provisions of sections 4 and 7 of this Act and so much of section 5 as imposes a penalty for interference. Save as aforesaid, nothing in this Act shall apply to apparatus for radio communication on any foreign ship.

Sec. 9.—That the trial of any offence under this Act shall be in the district in which it is committed, or if the offence is committed upon the high seas or out of the jurisdiction of any particular State or district the trial shall be in the district where the offender may be found or into which he shall be first brought.

Sec. 10.—That this Act shall not apply to the Philippine Islands.

Sec. 11.—That this Act shall take effect and be in force on and after four months from its passage.

Approved, August 13th, 1912.

EXTRACT FROM ACT.

(Dated August 24th, 1912.)

To Provide for Opening, Maintenance, Protection and Operation of the Panama Canal.

B Sec. 6.—That the President is authorised to cause to be erected, maintained, and operated, subject to the International Convention and the Act of Congress to regulate radio communication, at suitable places along the Panama Canal and the coast adjacent to its two terminals, in connection with the operation of said Canal, such wireless telegraphic installations as he may deem necessary for the operation, maintenance, sanitation, and protection of said Canal, and for other purposes. If it is found necessary to locate such installations upon territory of the Republic of Panama, the President is authorised to make such agreement with said Government as may be necessary, and also to provide for the acceptance and transmission by said system, of all private and commercial messages, and those of the Government of Panama, on such terms and for such tolls as the President may prescribe: *Provided*, That the messages of the Government of the United States and the departments thereof, and the management of the Panama Canal, shall always be given precedence over all other messages. The President is also authorised, in his discretion, to enter into such operating agreements or leases with any private wireless company or companies as may best insure freedom from interference with the wireless telegraphic installations established by the United States.

EXTRACT FROM RULES AND REGULATIONS.

(Dated August 15th, 1910.)

C 40. *Radio Communication.* — As soon as radio communication can be established with the Canal, vessels should report their names, nationality, length

draft, tonnage, whether or not they desire to pass through the Canal, require coal, provisions, supplies, repairs, to go alongside of a wharf, the use of tugs, probable time of arrival, length of stay in port, or any other matters of importance or interest. If this information has been previously communicated through agents or otherwise to the captain of the port, it will not be necessary to report by radio; but the probable time of arrival should always be sent.

41. Control of radio communication is entirely in the hands of the radio shore stations. No vessel will be allowed to interfere in the slightest degree with the Canal radio stations; upon an order being received by a vessel at any time while within the waters under the control of the Canal to discontinue using radio, even if in the midst of transmission of a message, she shall immediately comply.

42. Upon a ship's arriving within the 15-mile limit, and until leaving the 15-mile limit of the Canal Zone, she shall transmit only with low power, not exceeding one-half kilowatt.

43. Messages to stations will be sent only to Colon station (NAX) when in Gatun Locks and to northward thereof, and only to Balboa station (NBA) when in Miraflores Locks and to southward thereof; between these two points ships may work to either station, preferably to the nearer one; the high-power station (Darien) at Radio will not handle commercial work and will not be called for Canal business except in case of emergency.

44. All messages between ships in the Canal Zone and ships at sea must be forwarded through the nearer shore station.

45. Messages from ships in the Caribbean Sea for ships in the Pacific waters, or *vice versa*, shall be routed through the Canal Zone shore stations.

46. All vessels fitted with radio, after leaving the terminal harbour to pass through the Canal, shall keep an operator on watch until the further terminal harbour has been reached; this applies to the time when they are anchored in Gatun Lake, while passing through the locks, or moored to the lock walls, or to any of the wharves in the Canal proper, as well as when they are under way. Messages relating to the ship's movements and the Canal business shall take precedence over all commercial messages.

47. Pilots on vessels passing through the Canal shall have the right to use a vessel's radio freely for the transaction of the Canal business.

48. Under the direction of the pilots, vessels will from time to time report their progress through the Canal; accidents to machinery, propellers, steering gear, equipment, or anything else that may delay them or require assistance; any sickness or casualties that require medical attendance from Canal officials; or any other matters of importance that may arise.

49. No radio tolls, either coast station or forwarding, will be imposed against ships on radiograms transmitted by ships on Canal business. There will be no charge made against the Panama Canal, by Canal Zone land lines or radio stations, for the transmission of radiograms to ships on Canal business.*

50. No vessel will be allowed to communicate with any lock or signal station while in transit through the Canal, except through the pilot; all messages of any kind must be sent through him. This does not apply to vessels moored at the terminals at Cristobal or Balboa, before entering or after having passed through the Canal, which may wish to communicate through the terminal stations.

51. Vessels in transit through the Canal can communicate with the lock and signal station through the pilots, both by the international code and special signals; information on this subject may be obtained from the Governor of the Panama Canal.

118. In thick and foggy weather vessels will not be allowed to enter the Canal or leave locks or mooring station until the weather has cleared. Vessels in transit, when overtaken by thick or foggy weather, must immediately take every precaution and make preparation to anchor or moor at the first available place, and so remain until the weather clears. Vessels equipped with radio, when overtaken by thick or foggy weather, should immediately so report, in order that the proper fog signals may be made at the mooring stations on the approach of such vessels.

RADIO SERVICE.

Control of Radio.—The United States Government controls radio in the Republic of Panama and contiguous waters. The U.S. Naval Communication Service maintains three Naval Raido Stations in the Canal Zone; coastal stations at Colon and Balboa, and a high powered station at Darien. In the Republic of Panama it maintains Naval Radio Stations at Cape Mala, La Palma, and Puerto Obaldia. The Cape Mala Radio Station, located at Cape Mala, R. P., at the south-west entrance to the Bay of Panama, is connected by telegraph with the Canal Zone and all telegraph offices in the Republic of Panama. The Radio Stations at La Palma and Puerto Obaldia are located in outlying sections of the Republic of Panama which have no telegraph connections, and are primarily for intercommunication between these districts and other sections of the Republic of Panama and the Canal Zone, through Balboa Radio. Control of radio communication is entirely in the hands of these stations. No vessel will be allowed to interfere in the slightest degree with the Canal radio stations; upon an order being received by a vessel at any time while within the waters under the control of the Canal to discontinue using radio, even if in the midst of transmission of a message, she shall immediately comply.

Commercial Radiograms.—All Naval Radio stations given above, except Darien, are open to commercial traffic.

Canal Business Radiograms.—With the exception of Darien, all Naval Radio Stations given above will handle Canal business addressed to the proper officials of The Panama Canal, its departments and subsidiary companies. No receiving or forwarding charge will be made by the Naval Radio Stations for this service. The first word in the address of such messages should be "GOVT" (Example: "GOVT Port Captain Cristobal.") to show that they are official messages on Canal business. The shore stations reserve the right to decide whether a message is official or commercial in character.

Stations to be Called.—Ships on the Atlantic side will communicate only with Colon (NAX). Ships on the Pacific within 50 miles of Balboa will communicate only with Balboa (NBA). Ships in the Pacific when more than 50 miles from Balboa will communicate with Cape Mala

* As Amended by Executive Order of November 4th, 1914.

(NNT), from which station messages are relayed to the Canal Zone or Republic of Panama by telegraph. Ships in the Canal, when to the Northward of Darien will work Colon (NAX), when to the Southward of Darien work Balboa (NBA).

Ships will communicate through nearest shore station. On arriving within range of a shore station ships should send a (TR) position report, furnishing data required by Article 28, Service Regulations Affixed to the International Radiotelegraphic Convention, London, 1912. Due to the large amount of radio work in the vicinity of the Canal, and the necessity of reducing interference to a minimum, ships should send the required position report whether they have messages to transmit or not. This is desired in order that the calling of vessels by shore stations having messages for such ships may be reduced to a minimum. Upon receiving a position report from a ship, the shore station will know that the ship is in range and will immediately deliver any messages on file for that ship. Any ship which desires to communicate with a shore station, and has not previously submitted a (TR) report to that station, will be requested to submit such report before any messages are accepted from it.

All TR reports received are given to the Port Captain concerned and to the vessel's agents (if known).

Balboa Radio (NBA) is a distant control (Receiving) station, therefore, in case of emergency, Balboa Radio may be called and communication with it established, though Balboa may at the time be transmitting.

Hours of Service.—Colon, Balboa, and Cape Mala maintain a constant watch, day and night.

La Palma and Puerto Obaldia maintain daily schedules of watches.

EXTRACT FROM SUPPLEMENT TO RULES.

(Dated September 1st, 1913).

COMMERCIAL SERVICE AT NAVAL RADIO STATIONS.

Beginning September 1st, 1913, the radio stations of the United States Navy at Colon and Balboa are handling special classes of commercial radiograms, heretofore prohibited, as follows :—

1. Reply paid messages (where both message and answer can be prepaid by the sender).
2. Messages calling for repetition of messages (for verification only). Charge for repeating back is one-fourth the charge for the original message.
3. Radiograms to be delivered by mail. (If received from a ship, these will be mailed from the radio station. "Ocean letters" will be mailed by the ship at the first port of call, or at any port of call designated).
4. Multiple radiograms. These are messages addressed either to several persons at same address, or to same person at several addresses served by the same radio station. These messages when received from sea will be separated and sent as so many individual messages over the land wire.
5. Radiograms calling for acknowledgment of receipt. (Such acknowledgment is restricted to notification of date and hour at which the coast station delivered the radiogram to ship addressed; and may be sent by either mail or telegram).
6. Paid service notices. (Sent in order to correct address or text to cancel a message, etc.).

Both stations, Colon and Balboa, are connected by direct wire with the Panama railroad telephone system and radiograms can be filed at any local office. Attention is invited to the fact that no collect messages are handled, and no commercial messages are handled, between stations which are connected by cable or telegraph, as, for instance, to Key West or Port Lincoln.

The time of arrival of all Panama railroad boats is given to the telephone central at Colo as soon as received, and can be obtained there upon request without calling the radio station at Colon.

EXECUTIVE ORDER.

WIRELESS APPARATUS ON OCEAN-GOING VESSELS.

Published in Circular No. 601-16, dated Culebra, C.Z. July 23rd, 1914.

To Require Ocean-going Vessels to be Fitted with Wireless Apparatus.

By virtue of the authority vested in me, I hereby establish the following order for the Canal Zone :—

SEC. 1.—From and after the first day of July, 1915, it shall be unlawful for any ocean-going steamer of the United States, or of any foreign country, carrying fifty or more persons including passengers and crew, to leave or attempt to leave any port of the Canal Zone unless such steamer shall be equipped with an efficient apparatus for radio communication in good working order in charge of a person skilled in the use of such apparatus, which apparatus shall be capable of transmitting and receiving messages for a distance of at least 100 miles, night or day: *Provided*, That the provisions of this order, shall not apply to steamers plying only between the Canal Zone and ports less than 200 mile therefrom.

SEC. 2.—The master or other person being in charge of such vessel which leaves or attempts to leave any port of the Canal Zone in violation of any of the provisions of this order shall, upon conviction, be fined in a sum not to exceed Five Thousand Dollars ($5,000), and any such fine shall be a lien upon such vessel, and the vessel may be liable therefor in the District Court of the Canal Zone, and the leaving or attempting to leave by any vessel from each and every port of the Canal Zone shall constitute a separate offence.

SEC. 3.—This order shall take effect from and after this date July 9th, 1914.

EXECUTIVE ORDER.

FREE RADIO SERVICE FOR CANAL BUSINESS.

Published in Circular No. 601-33, dated Balboa Heights, C.Z., November 17th, 1.14.

Amending Paragraph 49 *of the "Rules and Regulations for the Operation and Navigation of the Panama Canal and Approaches Thereto, Including All Waters Under its Jurisdiction."*

By virtue of the authority vested in me under the Panama Canal Act, paragraph 49 of the "Rules and Regulations for the Operation and Navigation of the Panama Canal and Approaches Thereto, Including All Waters Under Its Jurisdiction," promulgated by Executive Order No. 1990 dated July 9th, 1914, is hereby amended to read as follows :—

49.—No radio tolls, either coast station or forwarding, will be imposed against ships on radiograms transmitted by ships on Canal business. There will be no charge made against the Panama Canal, by Canal Zone land lines or radio stations, for the transmission of radiograms to ships on Canal business.

PANAMA (REPUBLIC OF)

(See paragraph in italics, page 338.)

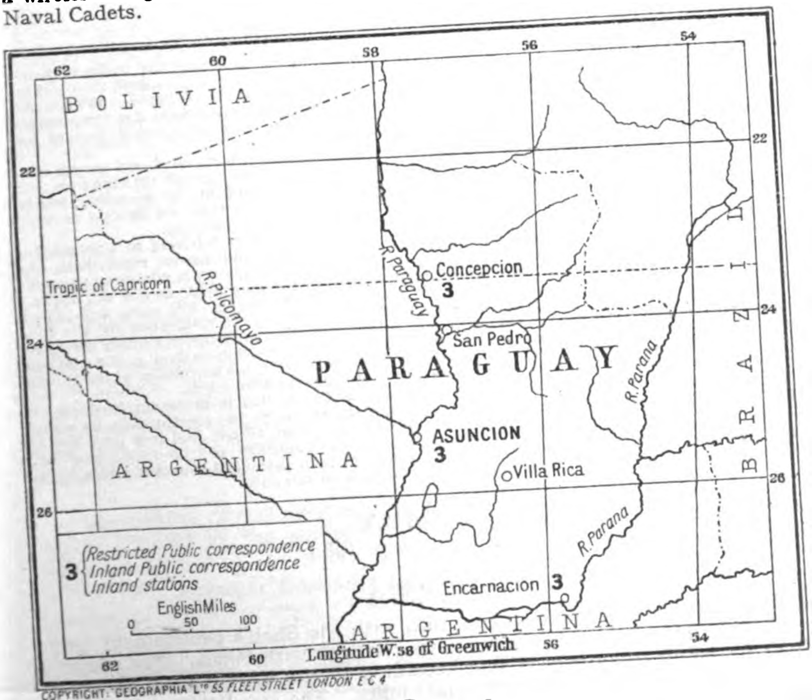
PARAGUAY

THE inland republic of South America known as Paraguay is divided into two distinct portions by the river bearing the same name. The first Spanish Colony was settled in 1535, and the country remained under Spanish rule until 1811. After a number of vicissitudes, the present constitution was proclaimed on the 25th November, 1870. The legislative authority is vested in a Congress of two houses, the executive being entrusted to a President, assisted by five Ministers.

CONTROL.

There are three wireless stations in Paraguay at present open to the public, their control being vested in the Director of Posts and Telegraphs. These stations are situated at Asuncion, the capital of the Republic (or—more strictly—Lambaré, on the outskirts thereof), Concepcion, and Encarnacion. They are identical in capacity and possess a radius of 300 miles by day and 600 miles by night. They were erected by Siemens Schuckert in accordance with a contract made between that firm and the Paraguayan Government in 1913. The Asuncion (Lambaré) station was completed in December, 1914, that at Concepcion in March, 1915, and that at Encarnacion was taken over by the Government in February, 1916.

There are no privately-owned stations. The Government has instituted a wireless telegraph school which is attached to the College of Military and Naval Cadets.



Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Dr. Luis A. Riart ..	Minister of Interior	Avenida Colombia, Asuncion
Miguel Gerónimo Soler ..	Dirctor General of Posts and Telegraphs	Calle Yegros, Esq. Bermejo, Asuncion
Juan B. Tendil	Head of Telegraph Office	431 Calle Oliva, Asuncion
Francisco Fernandez ..	Technical Inspector	Calle 14 de Julio, Asuncion

ORGANISATION.

The Paraguayan wireless service is at present confined to the interior of the country, for the Governments of Paraguay and Argentina have not yet been able to come to a working agreement for the maintenance of a public service. An agreement, however, has been entered into by the two Governments to use wireless as an auxiliary to relieve congestion or breakdown of the line system. (See Convention below.)

The three Government installations are not confined to a specific Government service, but are available for the public service within the country, and occasionally, on emergency, for communication with the exterior.

The War Department have seven subsidiary, or portable, installations for use at the five military centres and on the armed patrol steamers.

ADMINISTRATION.

There are no special laws or regulations affecting the subject, but the text of the Convention referred to above will be found below.

A—Convention between Paraguay and Argentina.

CONVENTION.

A The following is the text of a Convention entered into between the Governments of Paraguay and the Argentine Republic.

Date of the Convention,
November 15th, 1918.

Plenipotentiaries—
For Paraguay: Dr. Eusebio Ayala.
For Argentina: Dr. José Maria Cantilo.

After an interchange of credentials, which were found in order, the following agreement was signed, the object of which is to facilitate communication between the two countries mentioned.

1. For the telegraphic interchange between Argentina and Paraguay radiotelegraphic methods will be used as an auxiliary whenever—owing to the amount of traffic or breakdowns in the terrestrial lines—it may become necessary to use wireless in order to maintain an uninterrupted service.

2. Both the Argentina and the Paraguay offices will use for the exchange of messages the Posadas and Formosa stations, one at a time, or the two if necessary. The two managements will see to it that the traffic is distributed in such a way as to ensure the quickest service between the hours between 12 noon and 12 midnight, Argentine time. The wave-lengths will be of the standard damped type of 600 metres.

3. Whenever it is required, and should it be impossible to carry through the exchange over the stations named in the preceding article, the service may be taken off directly between Buenos Aires and Asuncion.

4. In all matters referring to transmission rates, accounts and service regulations, the Argentine and Paraguay regulations at present in force in the telegraphic service will apply.

5. This Convention will come into effect thirty days after its ratification by the contracting parties, and either party may withdraw at any time by giving 90 days' notice previous to the date when the suspension of the service is intended to take effect.

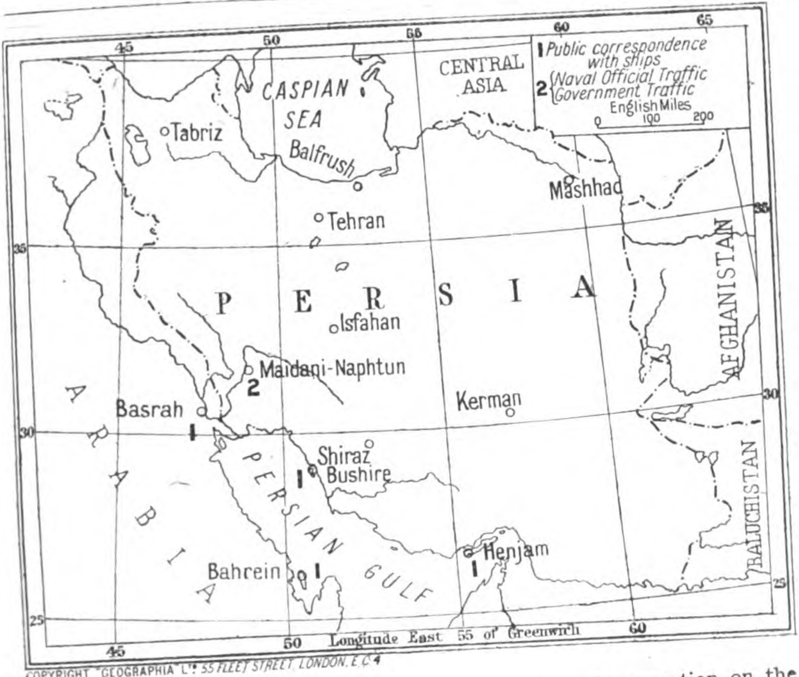
This Convention is made out in duplicate and signed by the two plenipotentiaries whose seals have been affixed, and they have agreed that the exchange of the ratification will take place in the city of Asuncion within thirty days from this date.

PEMBA

(See map on p. 198.)

PERSIA

THE recent agreement entered into with the Shah's Government lends an added interest to this country's relations with Persia. The country is divided into 33 provinces, and according to the most reliable estimates covers an area of about 630,000 square miles. The population exceeds nine



millions. The above map shows the wireless stations in operation on the shores of the Persian Gulf. They are in the hands of foreigners. No laws or regulations exist as yet in regard to their administration.

PERIM

(See map on p. 150.)

PERU

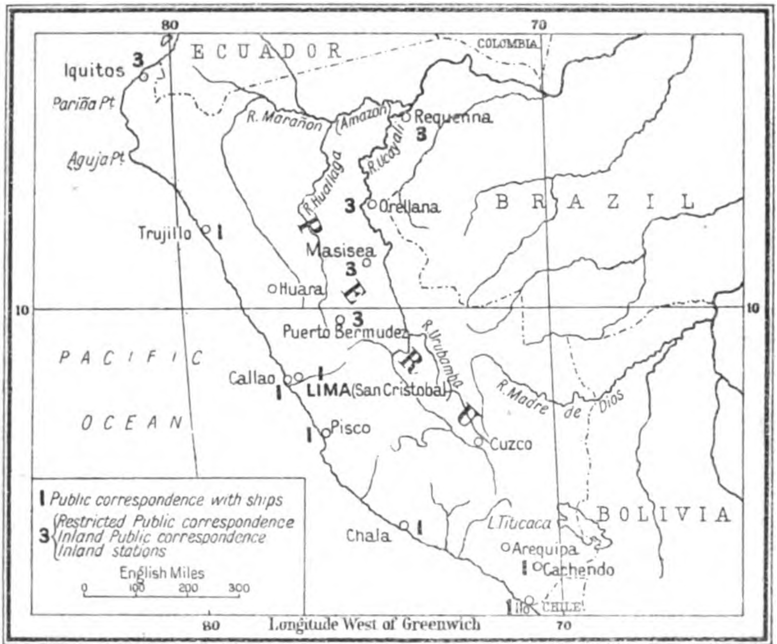
THE Republic of Peru, formerly the most important Spanish Vice-royalty in South America, declared its independence on July 28th, 1821, but was not actually free until three years later. Its constitution was proclaimed on November 10th, 1860, and entrusts the Executive power to a President, the legislation being in the hands of a Senate and House of Representatives. Territorially it is divided into twenty departments and three provinces; the total area being estimated at 532,617 square miles. The capital city is Lima, which is closely connected with Callao, its port on the Pacific coast.

CONTROL.

The control of radiotelegraphy is not vested in the Postmaster-General, but is directed by the Ministerio de Fomento (Minister for Progress and Public Works).

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Señor Don Ing. Tamayo ..	Director del Servicio Radiotelegraphica del Peru	Lima.



ADMINISTRATION.

There are fourteen radiotelegraphic stations open to public service in Peru, but no special legislation has been issued, the wireless service being subject to the same regulations as the ordinary wired service, differing therefrom only with regard to rates.

PHILIPPINE ISLANDS

THE Philippine Islands form a part of the great archipelago known as the East Indies. They lie south-east of the continent of Asia, nearly south of the Japanese Islands and north of Borneo and Célebes; between the meridians of 116° 40′ and 126° 34′ east longitude, and between the parallels of 4° 40′ and 21° 10′ north latitude, that is, entirely within the tropics. The boundaries and the limits of the group are set forth in the paragraph concerning limits in the Treaty of Paris between the United States and Spain, of December 10th, 1898.

In addition to the lands thus delimited, the United States subsequently acquired from Spain the little group of islands known as Cagayan Sulu, and nine other small islands, lying off the north coast of Borneo.

The Philippine Islands have an area of about 115,000 square miles. Considering the Philippine archipelago by itself, it may be regarded as having the form of a triangle. open at the base and with its most acute angle pointing northward, this being represented by northern Luzon and the Batan and Babuyan Islands. The western leg of the triangle is represented by Paragua and dependent islands, and the eastern one by the Visayan Islands and Mindanao, with the Sulu sea lying between them.

These islands, and the mountain ranges upon them, have in general a trend which may be roughly described as northward and southward, although certain of them, such as that forming the backbone of Paragua, trend nearly north-east and south-west, while others trend to the west of north and east of south.

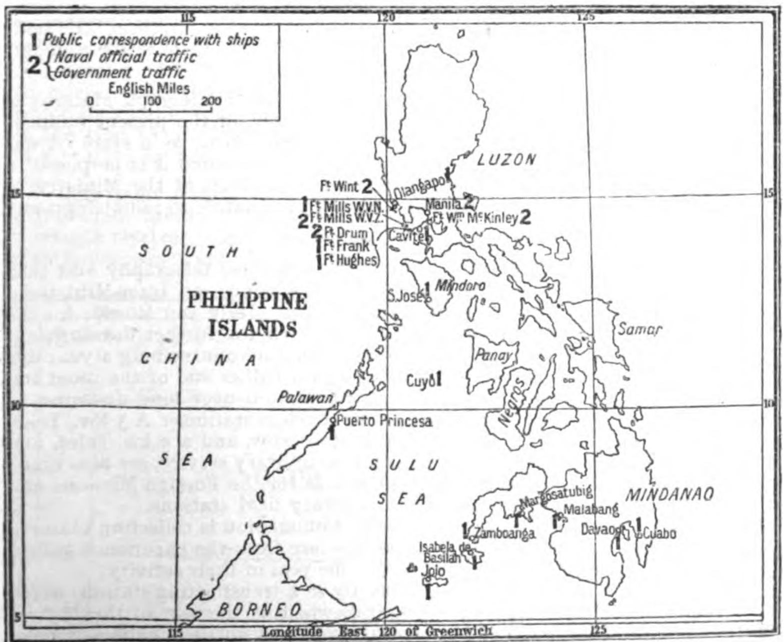
The Philippine Islands are a possession of the United States, with a representative and practically autonomous government.

CONTROL.

Several of the stations now operated by the Bureau of Posts were originally erected by the Signal Corps, United States Army, when that Corps operated the telegraph and cable lines of the Philippines, but with the rest of the telegraph system of the Philippine Islands they were, during the period from 1903 to 1907 gradually turned over to the Civil Government, the entire telegraph system, other than military lines and wireless stations, being now controlled by the Government of the Philippine Islands and forming a part of the Bureau of Posts.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
José Topacio	Acting Director of Posts	Manila
Felipe Cuaderno	Superintendent, Administrative Division	Manila
C. P. Shuman	Superintendent, Manila Post Office	Manila
C. Siddayao	Acting Superintendent, Inspection Division	Manila
J. Ruiz	Acting Superintendent, Money Order Division	Manila
José Alba	Superintendent, Postal Savings Bank Division	Manila
Santos Javier	Superintendent, Accounting Division	Manila
Eugenio Padua	Superintendent, Telegraph Division	Manila



ORGANISATION.

Nearly all of the commercial wireless traffic of the Philippines is between shore stations, which form an integral part of the telegraph system of the Insular Government. There is as yet no special legislation affecting radio-telegraphy at present in force, the wireless stations being administered under the same general laws and regulations as the landline and cable offices. In fact, practically all of the offices consist of post office, landline, cable or wireless, all under one roof, with a postmaster-operator in charge.

The Continental Morse alphabet is used on the wireless, and the American Morse alphabet on land and cable lines; and the radio laws and regulations of the United States are conformed to as far as local conditions permit. The service is operated and maintained almost entirely by Filipinos.

There are no wireless societies, nor amateur or privately owned stations on record in the Philippines. There is one ship station on a Government-owned vessel, and one ship station on a privately-owned vessel.

There are 15 land stations open for general public service, 10 of them operated by the Bureau of Posts. These include five operated by the United States Army or Navy, but not ship stations licensed by the United States Government.

The Bureau of Posts has an extensive programme for the erection of additional wireless stations, and the erection of 18 new wireless stations in different parts of the archipelago is now under way. New telegraph offices are being opened from time to time.

POLAND

THE historic Kingdom of Poland has recently been rightly restored to its former position. Its record has been an unhappy one, culminating in its third and last partition between Austria, Prussia and Russia in 1795, this division being subsequently rearranged by the Congress of Vienna in 1815, so that the original shares of Prussia and Austria were diminished. All that, fortunately, is past history and Poland now finds herself on the threshold of a new life full of promise to herself and her immediate neighbours.

CONTROL.

Normally the establishment and control of radiotelegraph stations is vested in the Ministry of Posts and Telegraphs, but at the present moment these functions lie in the hands of the Ministry of War, as a state of war exists in the country. When stable conditions are restored it is proposed to establish a wireless telegraph department (as a branch of the Ministry of Posts and Telegraphs) for dealing with all matters relative to radiotelegraphy and radiotelephony.

ORGANISATION.

In anticipation of a great development of wireless telegraphy and telephony after the termination of the military operations, an Inter-Ministerial Commission has already been formed as in France, Italy and Russia, for the purpose of studying the problems connected with the further development of wireless telegraphy—which was introduced in our country only a year ago by the Military Authorities—and which is regarded as one of the most important of the up-to-date means of communication over long distances.

There exist in Poland three permanent wireless stations: A 5 kw. Telef. (Telefunken) at Warsaw, a 4 kw. Poulsen at Cracow, and a 5 kw. Telef. and 4 kw. Poulsen at Posen, which, in addition to military service, are also doing service for aviation and meteorology, as well as for the Foreign Missions and the Press. There are also a number of military field stations.

The above-mentioned Inter-Ministerial Commission is collecting material on this subject, and benefits in a large measure from the experience gained by the military wireless stations during the one year of their activity.

The Central Wireless Station acts mostly as a transmitting station, which is explained by its situation in the capital, which is the seat of the highest military and civil authorities, but it also receives a small quantity of press

communiqués, whereas the Posen and Cracow wireless stations are almost exclusively engaged in receiving press communiqués sent to the capital by wire or by telephone.

Experts have been appointed to examine a project for the construction of a large wireless station at Warsaw of 200 to 300 kilowat power for communication with America, whereas if the station is used for communication with European stations only, it will have a power of some tens of kilowats.

After the results of the experiments with a receiving station fitted with a "frame antenna," a station of this type will be erected at Warsaw in the near future exclusively for receiving press news. The Polish permanent wireless stations are receiving systematically commercial and meteorological communiqués from all most important foreign places, whilst the Warsaw Central Station is transmitting daily a press and meteorological communiqué.

ADMINISTRATION.

The existing rules and regulations respecting the wireless service are of a temporary nature, and for military use only, and for obvious reasons cannot be given here.

PORTO RICO

(See Puerto Rico.)

PORTUGAL

(See map on p. 384.)

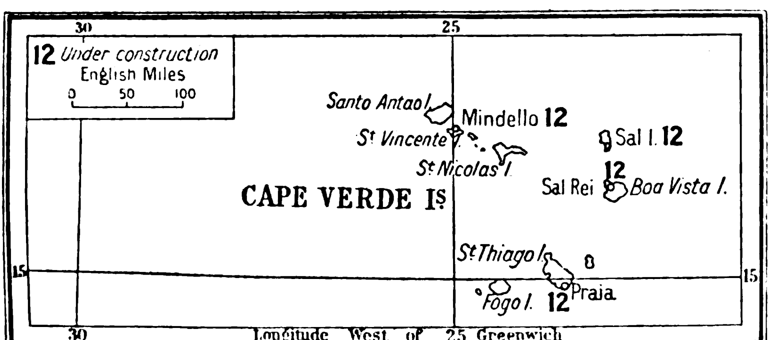
An independent State since the twelfth century, "England's Oldest Ally" remained a monarchy till 1910. On October 5th of that year the Republic was proclaimed, and on August 20th, 1911, the present Constitution was established. Affairs are administered by a President, the two Chambers reserving to themselves the legislative functions.

Portugal is a country with 5,500,000 inhabitants, and has a superficial area of 49,792 square miles (including the archipelago of the Azores and Madeira Island). She claims to be the pioneer colonising nation of the modern world.

From 1418 to 1557, the great exploration period of the Portuguese, they conquered vast territories in Africa, Asia, America, and Oceania, some of which they lost in India and America, when Brazil proclaimed its independence in the year 1822. Nevertheless, the Portuguese colonies still cover an area of 1,111,572 square miles.

CONTROL.

The radiotelegraphic service in Portugal is a state monopoly. No private individual is allowed to erect or work wireless, and may not even own a simple receiver. The only exception made is that in favour of shipping companies, which are allowed to have wireless stations on board their vessels.



OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Dr. João Alberto Pereira de Azevedo Neves	Minister of Commerce	Lisbon
Henrique Jacinthe Ferreira de Carvalho	Postmaster-General	Lisbon
Colonel Alvaro Cesar de Mendonça ..	Minister of War	Lisbon
Manuel Alves de Mattos	Inspector of Telegraphic Military Service ..	Lisbon
Dr. Alexander de Vasconcellos e Sá	Minister of Colonies	Lisbon
Admiral Canto e Castro	Minister of the Navy	Lisbon
Admiral D. Bernardo da Costa ..	President of the Technical Committee of Torpedoes and Electricity	Lisbon

STATIONS IN PORTUGAL (INCLUDING AZORES).

There are no private stations and no amateur stations, for wireless is a State monopoly. The experimental stations at the School of Torpedoes and Electricity at Valle de Zebro are confined to the station of the Naval School.

Land stations open for Government traffic only ... 1
Land stations open for public correspondence ... 2
And a number of ship stations open for public correspondence.

PORTUGUESE EAST AFRICA.

Land stations open for public correspondence ... 3

PORTUGUESE WEST AFRICA.

Land stations under construction 17
Land stations open for public correspondence ... 3

CAPE VERDE ISLANDS.

Land stations under construction 4

ORGANISATION.

Portugal's first experiments in wireless telegraphy date from 1905, and were conducted with two small Telefunken stations on a war vessel and the fortress of Cascaes, by the staff of the Posts and Telegraphs. The results, however, were not very satisfactory. Later on, Alvares, Captain of Engineers, carried out experiments on a small scale with two Decretet stations having coherer receivers. In 1907 the first fixed station was set up at the School of Torpedoes and Electricity at Valle de Zebro (Escola de Torpedos e Electricidade).

With this Naval station a series of experiments were made, and it was here that the first studies in wireless originated, and the first officers and sailors of the Portuguese Marine received instruction.

The whole work of installation, tests, and tuition was directed by the naval officer who at the time was the instructor at the School of Torpedoes and Electricity, and who was in charge of the Wireless Telegraphy Department.

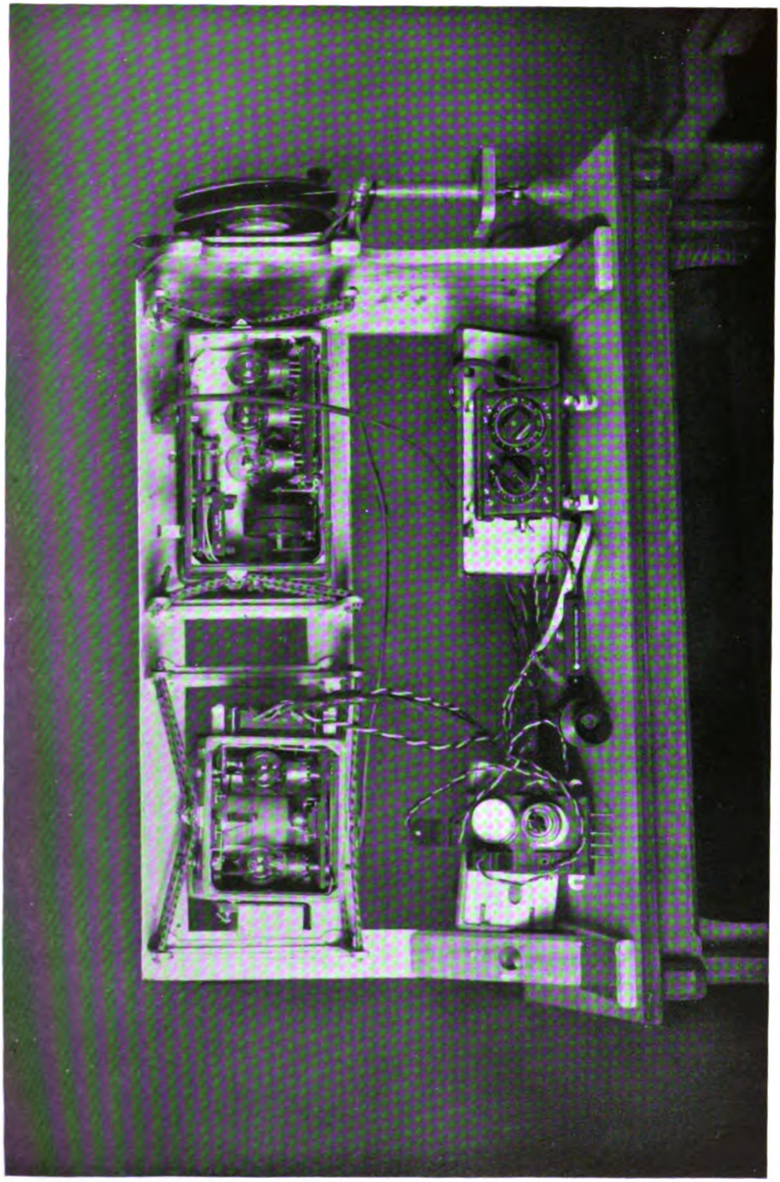
Nowadays, the School of Torpedoes and Electricity at Valle de Zebro, besides having the old apparatus for instruction, possesses a complete Marconi station with all the receivers used in the Navy, and continues to be a Naval School for officers and sailors.

Radiotelegraphy has made considerable headway, especially in the Portuguese Colonies.

Contracts have been entered into between the Colonial Office and the Marconi Company for stations at Timor (Java) and a network of stations at Angola (West Africa). A complete system of installations has been arranged for São Thomé (Gulf of Guinea) and for Mozambique (East Africa). The present Minister of Colonies, Dr. Alexandre de Vasconcellos e Sa, is responsible for the execution of this project.

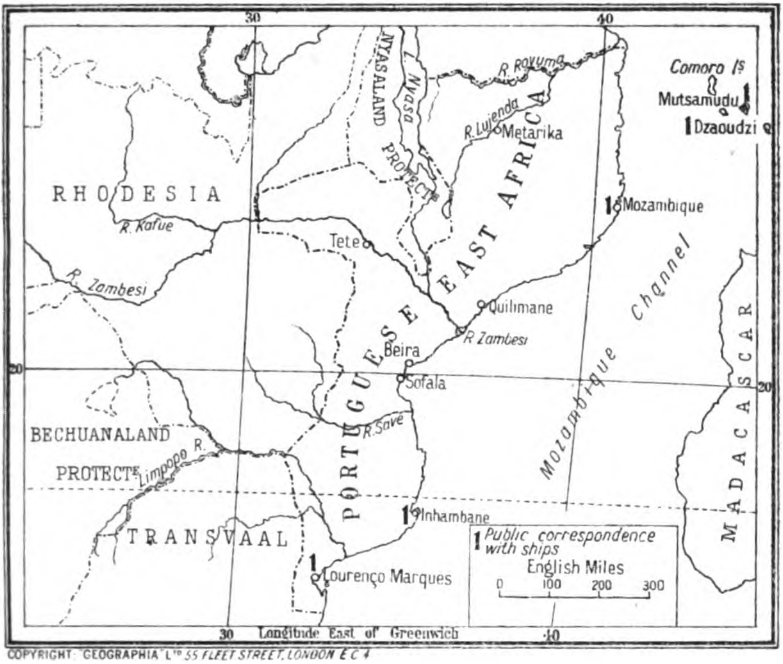
The Administration of Posts and Telegraphs have also purchased a 5-kw. station for Terceira Island (Azores).

For the present, the stations in the interior of Angola are reserved for the sole use of the Government.



R.A.F. WIRELESS TELEPHONE SET, SHOWING FRENCH VALVES.

[*To face page* 352



ADMINISTRATION.

The current laws and regulations reprinted below comprise :—

A—Act of July 15th, 1913.
B—Regulations.
C—Decree of April 8th, 1916.
D—Decree of March 29th 1917.

THE ACT OF JULY 15TH, 1913.

A 1. On the expiration of a period of three months from the approval of the Regulation for the execution of the present law, no Portuguese steam vessel, with accommodation for more than fifty passengers (including crew), shall be permitted to sail from any port without having installed a wireless telegraph apparatus of the system which suits it best, in good working order, and capable of dispatching and receiving radio-telegrams within a radius of action which must never be less than 100 miles.

(*a*) From this provision those steamers are excepted which navigate only between ports situated at distances of less than 200 miles.

(*b*) For steam vessels, which navigate in the Colonies where there are coastal radio-telegraph stations, and which only occasionally come to the Metropolis, the period granted for the installation of wireless telegraphy, to which the present article refers, shall be six months.

2. The wireless telegraph material of a vessel, and the respective service of transmission and reception of radiotelegrams, shall be under the charge of one or more duly qualified telegraphists.

§ The number of telegraphists, their qualifications, and that of the indispensable auxiliary staff, the organisation of their technical instruction, provisions with respect to the service of supervision, conditions of the installation of the apparatus, and the official verification of their working, shall be determined pursuant to the Regulation drawn up for the execution of the present law.

3. It is the province of the captain of the vessel to give instructions and orders for the complete carrying out of the laws and regulations in force with respect to the radiotelegraphic service, and he shall exercise the necessary supervision, carrying out and causing to be carried out any provisions which he may consider advantageous for the good working of the said service.

4. The captain shall be held responsible for any negligence in complying with the requirements of Article 1, and on conviction he shall be liable to a fine not exceeding Rs.200 and the suspension of his master's certificate for one year.

5. Negligence or failure on the part of the captain to carry out the provisions of Article 3 shall render him liable to a fine not exceeding

Rs.50, which may be accompanied with imprisonment not exceeding one month after the first offence.

6. If there should be a disaster, stranding or loss of the vessel, resulting from the lack of vigilance of the telegraph staff, and the said fault was due to the negligence of the captain in failing to carry out and causing to be carried out the provisions in force relating to the radio-telegraph service, the captain shall be liable to a fine not exceeding Rs.200, accompanied or not, according to the gravity of the offence, with suspension of his certificate for a period of from one to five years.

If the serious injury, or the death, of one or more persons should result from the disaster, the penalties applicable shall be respectively those laid down in Articles 368 and 369 of the Penal Code.

7. The offences referred to in Articles 4, 5 and 6 constitute maritime crimes, and shall be judged by the Commercial Maritime Tribunal pursuant to the Disciplinary Code of the Mercantile Marine.

8. All the wireless apparatus intended for Portuguese vessels shall be exempt from Customs and Municipal Duty.

9. Any legislation contrary hereto is hereby repealed.

REGULATIONS.

B The following regulations were issued on August 29th, 1913 :—

1. Ships may be equipped with any wireless telegraph apparatus which is in keeping with scientific progress.

2. The shipping or any other company may establish and work a wireless telegraph station on board ship. The station must possess a licence granted by the Government of the nationality to which the ship belongs. The "class" of the station is mentioned in the licence.

3. There are three classes :—

(a) Long voyage passenger steamers with accommodation for more than 150 passengers must maintain continuous service.

(b) The same type of steamer with accommodation for less than 150 passengers must maintain continuous *receiving* service, whereas the transmission may be limited.

(c) Cargo or fishing boats, or vessels carrying more than 50 persons (including crew), may have limited service.

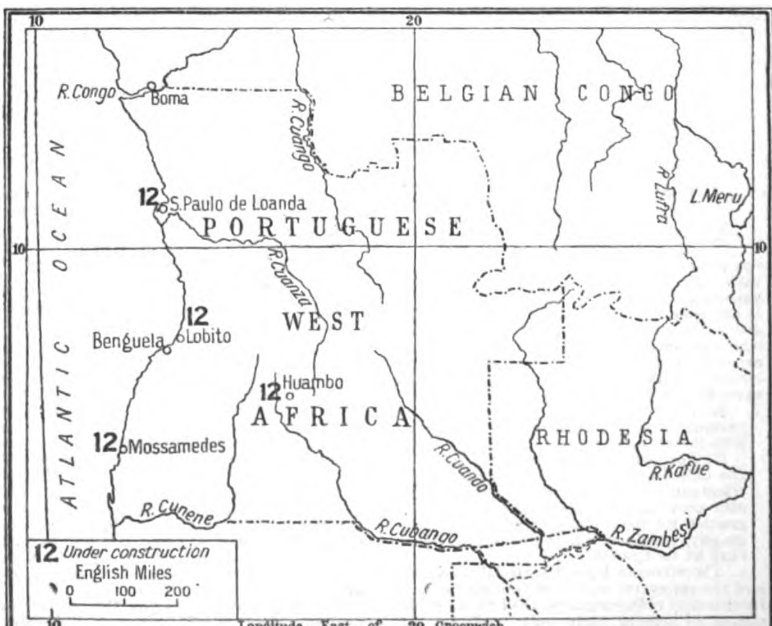
4 and 5. Wave-lengths of 300 m., 600 m., and more than 1,800 m. may be employed. Small boats may work on a 300 m. wave when sending, but 600 when receiving. The waves must be as pure and as undamped as possible.

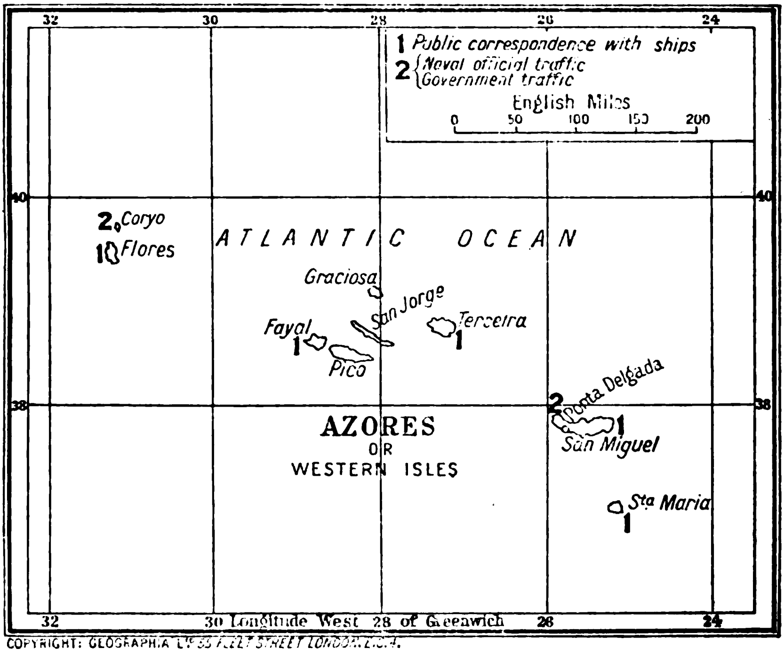
The oscillator must not be directly connected to the antennæ, except in case of distress, or on certain small steamers where the energy employed in the primary does not exceed 50 watts.

6. The cabin must be divided into two parts so that the transmitting gear and the spark gap may be separated from the receiving apparatus. Double walls must be used to isolate the interior from the exterior.

7. The instruments must be able to receive and send 100 letters per minute.

8. New installations employing a power of more than 50 watts must possess such arrangements as will enable them to have a range inferior to their normal, the smallest being





approximately 15 miles. All old stations must be brought to this standard as soon as possible.

9. The receiving instruments must be able to tune for waves up to 600 m., being highly protected against perturbations.

10. The power measured at the terminals of the generator must not exceed 1 kw. in normal circumstances. An increase is allowed when a station desires to communicate with a land station other than the nearest, at a distance of more than 200 miles from the nearest land station, and when, in exceptional circumstances, the communication cannot be effected with 1 kw.

11. First and second class steamers must carry an emergency set in as safe a place as is possible. The emergency set must be able to work for six hours at least at a distance of 80 miles for first class, and 50 miles for second-class steamers.

12. The apparatus must be operated by a telegraphist who possesses a certificate from the Portuguese Government, or, in urgent cases and for one trip only, from any other Government which has signed the International Convention :

13. There are two certificates :—

(*a*) 1st Class (same as International).

(*b*) 2nd Class (12 words, adjustment of apparatus, knowledge of each instrument and its work, and rules *re* handling of telegrams).

Service.—Any member of the crew able to assist the telegraphist in his work, and possessing a knowledge of the operation of the apparatus, may be an "auxiliary" operator.

14. Second class telegraphists may be employed on board where the wireless service is only for the shipping company's requirements or on fishing vessels, or they may act as assistants in cases where there is already one first class operator. On first class steamers two first class telegraphists must be employed.

15. On second class steamers, one first class and one second class telegraphist should be employed ; on third class vessels one second class telegraphist will suffice.

Service.—As long as land stations do not exist in the Portuguese colonies, Portuguese steamers plying there are allowed to carry one first class telegraphist and one "auxiliary."

16. Transmitting must be performed by a first or a second class telegraphist, except in urgent cases.

17. The certificates state that the telegraphist has taken an oath of secrecy with regard to the correspondence.

18. The captain has authority over the working of the station.

19. Portuguese operators are preferred.

20. Should none be obtainable, foreigners may be employed if they are in possession of the Portuguese Government's certificate.

In urgent cases where no certificated telegraphist is available, provisional certificates may be issued for one voyage.

21. Certificates are supplied by the Commission after the examination of the telegraphist.

22 and 23. Captains are also bound by an oath of secrecy.

32. All telegrams sent and received on board must be registered by the captain on forms supplied by the Government. The date and hour of the sending or reception of these telegrams must be indicated.

33. Only the telegraphists and the captain are allowed to enter the wireless cabin.

34. The wireless room and the bridge must be connected by either a speaking tube or a telephone, unless they are within easy distance of one another.

Decree of April 8th, 1916.

This decree forbids the installation of either wireless transmitting or receiving stations, but Government can authorise the setting up of receiving stations only.

These said stations, when authorised by Government, are subject to its control, and whenever Government may judge convenient, it may withdraw the same authorisation without any indemnification.

The owners of these stations have to pay in advance the tax of Escudos $5.50 per annum.

Anyone who sells wireless material is obliged to send to the Government a statement of the material sold, with the names of the persons who have purchased it to identify them. Those who do not fulfil this identification will pay the fine of Escudos $20.00 to $100.00, and all the material that he has for sale will be seized by the Government, and will belong to the Government. In case of a second offence he will be prosecuted.

The owner of any receiving station, or any person who may have made use of the same station, and who divulges contents of messages that have been received by such station incurs a penalty.

In case of a second offence he is subject to imprisonment for six months to a year, and a fine.

Decree of March 29th, 1917.

In consideration of the highest interest of the State, it is undesirable in the existing circumstances that private persons should possess wireless apparatus of any kind, or make use of the same apparatus.

It has been decided that it is desirable to confine the employment of such apparatus to schools and observatories, so as to limit the risk of misuse; and availing ourselves of the authorisation granted by the Executive Power by the Laws Nos. 373 & 491 of September 2nd, 1915, and March 12th, 1916,

We decree by the proposal of the Minister of Works and Social Providence, the following :—

Art. 1.—It is expressly forbidden to private persons to possess or make use of wireless apparatus and fittings, or to import or sell to the public the said apparatus and accessories.

Art. 2.—The owners—whatever they may claim to be its purpose—of apparatus and wireless accessories without conducting wires, will have to deliver the said articles for deposit against receipt; in Lisbon, at the warehouses of the Material of the Posts and Telegraphs; in Oporto, at the Secretary's Office of the Second Electric Circumspection; and in the other capitals of the administrative districts of the continent and adjacent islands, at the Secretary's Offices of the Electric Sections and Sub-sections, or of the Post and Telegraph Service.

The deliveries in deposit to which this article refers will have to be effected for the Continent of the Republic, in the maximum period of five days from the date when this Decree is published in the "Diario do Governo"; for the adjacent islands in the same period reckoned from the date when the same daily paper reaches there.

Art. 3.—The apparatus and wireless fittings without conducting wire that are in the Government Teaching Institutions, and at the Astronomical and Meteorological Observatories, in the first case for the purpose of demonstration, and in the second case for scientific tests, are to be under the safe keeping of the directors of the same institutions and observatories, and will be used only for those purposes and in the presence of the said directors and under their entire responsibility, in the presence of the respective teachers and observers.

Art. 4.—He who transgresses the stipulations of this Decree incurs a penalty of Escudos $20.00 to $100.00, which will be fixed and collected by the Administration of Posts and Telegraphs; when it is paid voluntarily, the same Administration will order all the material to be seized, which will then belong to the Government.

In case of a second offence the fine will be fixed at its maximum.

If the fine is not paid voluntarily, the transgressors will be handed over to the judiciary, in order to be judged and the penalty imposed by the correctional police.

In Lisbon and Oporto the jurisdiction will concern the tribunal of transgressions.

Art. 5.—This Decree will come into force immediately, and will be valid till the end of the European War, after which the apparatus and wireless fittings which were voluntarily delivered will be returned to their owners, against receipt as to the conditions of Article 2.

Art. 6.—All legislation to the contrary is hereby revoked.

PORTUGUESE EAST AFRICA

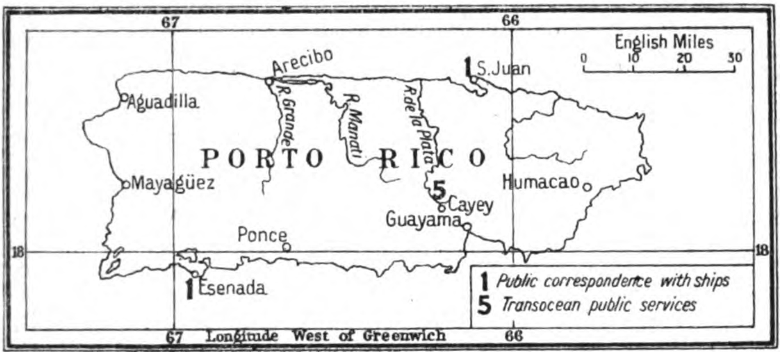
(See Portugal.)

PORTUGUESE WEST AFRICA

(See Portugal.)

PUERTO RICO

THE island of the "Greater Antilles" group in the West Indies known under the Spanish name of Rich Harbour lies with regard to latitude between 17° 50′ and 18° 30′ north; its longitude ranging from 65° 30′ to



67° 15′ west, and its total area comprising 3,606 square miles. The capital, San Juan, is 1,400 miles from New York and 982 from Key West, Florida. It is administered by a Governor, with an Executive Council appointed by the President of the U.S.A. and a House of Delegates elected for two years.

CONTROL AND ORGANISATION.

The regulation of wireless telegraphy rests in the hands of the U.S.A. Navy Department, Washington, and no clubs or societies exist in the island. There are private stations worked by the Central Guanica (Sugar Refining) Company, connecting with the Central Romana (a similar company) in the Republic of Santo Domingo, and three stations open for public correspondence with ships.

RHODESIA

CECIL RHODES, the "Colossus of South Africa" (*floruit* 1853-1902) has bequeathed his name to British Colonies covering an area of over 438,575 square miles. Rhodesia is bounded on the south by the Transvaal, on the north by the Congo State, and what used to be "German East Africa." On the east lies Portuguese East Africa, and on the west the Belgian Congo, Bechuanaland, and Portuguese West Africa.

For administrative purposes this vast territory is divided into Northern and Southern Rhodesia, the Rhodesian Chartered Company governing under the prescription of British Orders in Council.

Northern Rhodesia

In this Administrative Division the headquarters are located at Livingstone, and the district is mainly agricultural.

ORGANISATION.

With regard to projected Aviation Stations in this territory, aerodromes have been constructed at Abercorn (close to Lake Tanganyika), Ndola, Broken Hill and Livingstone (the three latter being all on the railway line) in connection with the projected Cairo to Cape air flight.

Southern Rhodesia

CONTROL.

Wireless Telegraphy is under the control of the Department of the Administrator, and the principal assistants of the Postmaster-General in such matters are the Government Electrical Inspectors at Salisbury and Bulawayo. There are no *Wireless Clubs* or *Societies.*

ORGANISATION.

No licences have yet been issued for wireless installations in Southern Rhodesia, and the form of licence has not been fixed.

A site for an aerodrome for use in connection with a projected flight from Cairo to Cape Town has been selected at Bulawayo, but no arrangements have yet been made for a wireless installation there.

Southern Rhodesia, whose centre is at Salisbury, regulates radiotelegraphy within its border by the " Electric Telegraph Amendment Ordinance " of 1904, and sundry Postal Notices of 1912, the text of which will be found below.

No new legislation on the subject to come into force in 1920 has yet been prepared, but it is possible that additional Regulations may become necessary in connection with radiotelegraphy in conjunction with aerial navigation.

ADMINISTRATION.

An Ordinance and Regulations for the control of aviation are now under consideration and will be discussed at a Conference which is proposed to be held in Pretoria at no distant date. It is anticipated that the Laws and Regulations will closely follow those in force in the United Kingdom.

A—Electric Telegraph Amendment Ordinance, 1904.
B—Postal Notice No. 55 of 1912.
C—Postal Notice No. 391 of 1912.

TELEGRAPH (AMENDMENT) ORDINANCE.

A The term " electric telegraph " whenever used in the " Electric Telegraph Act, 1861," or any law amending the same or relating to " electric telegraphs," shall be interpreted as including any system or means of conveying signs, signals, or communications by electricity, magnetism, electro-magnetism, or other like agency, and whether with or without the aid of wires, and including the system commonly known as wireless telegraphy, or ætheric signalling, and any improvements or developments of such system; and the term " line of electric telegraph " shall be interpreted as including any apparatus, instrument, mast, standard, wire, substance, matter, or thing whatever, which is, or may be, used for the purpose of sending, transmitting, conveying, or receiving such signs, signals, or communications.

2. The meaning of the term " person " shall be further extended so as to include individuals, partnerships, companies, and corporations.

3. The provision of the first section of the said Act as to its application to Southern



Rhodesia shall be read and construed as including the territorial waters thereof.

4. Within Southern Rhodesia, or the territorial waters thereof, no person not thereto expressly authorised by some law shall erect or make use of any mast, standard, or apparatus of any kind, for the purpose of signalling without wires by means of electricity, magnetism, electro-magnetism, or other like agency, or shall erect or construct any line of electric telegraph, except under a licence to be granted by the Administrator.

5. The Administrator may authorise the issue of a licence for the establishment or use of any apparatus or installation for the transmission of signs, signals, or communications, by electric telegraph, with or without the aid of wires, and may revoke the same at any time, and there shall be payable annually in respect of such a licence such sum not exceeding One Hundred Pounds sterling, as may be fixed by regulation.

6. The terms and conditions of such licence, and the duration thereof, shall be subject to such regulations as may from time to time be made by the Administrator.

7. Any person who shall establish or use, or attempt to establish or use, any such apparatus or installation as is mentioned in Sections 1 and 4 of this Ordinance, in contravention of the provisions thereof, or of any other law relating to electric telegraphs, or of any regulation thereunder, shall be liable upon conviction to forfeit all apparatus so used, and to a penalty not exceeding Two Hundred and Fifty Pounds, and, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding three months, and, in case of a second or subsequent conviction, in addition to such forfeiture to a penalty not exceeding Five Hundred Pounds, or in default of payment to imprisonment, with or without hard labour, for a period not exceeding six months.

8. Any Magistrate or Justice of the Peace before whom information shall be given on oath by credible persons, that the provisions of this Ordinance are being, or have been, or are likely to be infringed, may issue a search warrant, and authorise the seizure of any instruments, apparatus or appurtenances reasonably suspected to be intended for use in such contravention.

9. Notwithstanding the provisions of Section 4 of "The Electric Telegraph Act, 1861," all regulations made under the authority of that Act shall be published in the *Gazette*, and be subject, *mutatis mutandis*, to the provisions of Section 7 of Act No. 5 of 1883 of the Cape of Good Hope.

10. This Ordinance may be cited as the "Electric Telegraph Amendment Ordinance, 1904," and shall be read as one with "The Electric Telegraph Act, 1861," of the Cape of Good Hope, and the "Telegraph Protection Ordinance, 1901," and the said laws may be cited together as the "Electric Telegraph Laws, 1861 to 1904."

POSTAL NOTICE NO. 55 OF 1912.

B Public attention is hereby directed to the provisions of the "Electric Telegraph Amendment Ordinance 1904," under which no person not thereto expressly authorised by some law shall erect or make use of any mast, standard or apparatus of any kind for the purpose of signalling without wires by means of electricity, magnetism, electro-magnetism or other like agency, or shall construct any line of electric telegraph except under a licence to be granted by the Administrator.

The term "Line of Electric Telegraph" is defined as any apparatus, instrument, mast, standard, wire, substance, matter or thing whatever which is or may be used for the purpose of sending, transmitting, conveying or receiving signs, signals, or communications.

All persons having, or desiring to have, such lines of electric communication, including telephone lines, whether on their private property or otherwise, are hereby notified that application for licence to use such lines must be made to the Administrator through the Postmaster-General.

The licence fees payable in respect of such lines, as published in Government Notice No. 391 of 1912 are as follow :—

(*a*) 1s. per annum for a private telephone or telegraph line exclusively on the private property of the person constructing and using the same ;

(*b*) 10s. per annum for a private telephone or telegraph line passing beyond the boundaries of the owner's land. (The licence does not confer any right to erect telephone or telegraph lines outside the boundaries of the applicant's land, and the applicant must make his own arrangements in this regard) ;

(*c*) £50 per annum for any installation of wireless telegraphy or telephony

All persons having in use lines of electric communication which have not been authorised by the Administrator are hereby notified that unless the required permission be applied for within one month of the date of publication of this Notice they will render themselves liable to the penalties provided in Section 7 of the Telegraph Ordinance above referred to.

GOVERNMENT NOTICE.

No. 391 of 1912.

DEPARTMENT OF POSTS AND TELEGRAPHS.

The Treasury, Salisbury,
December 19th, 1912.

C It is hereby notified for public information that His Honour the Acting Administrator, with the advice of the Executive Council, has been pleased to approve of the following Regulations regarding the issue of licences for installations of private telephones, telegraphs, or other means of electric communication, whether with or without wires, in terms of section 5 of the "Electric Telegraph Amendment Ordinance, 1904."

By command of His Honour the Acting Administrator in Council.

P. D. L. FLYNN, Acting Treasurer.

When any person is authorised to establish or use any means of electric communication as defined in the "Electric Telegraph Amendment Ordinance, 1904," the Postmaster-General may issue to such person an annual licence for the use of such line on payment in advance of the undermentioned fees, namely :—

(*a*) 1s. per annum for a private telephone or telegraph line exclusively on the private property of the person constructing and using the same ;

(*b*) 10s. per annum for a private telephone or telegraph line passing beyond the boundaries of the owner's land. (The licence does not confer any right to erect telephone or telegraph lines outside the boundaries of the applicant's land, and the applicant must make his own arrangements in this regard) ;

(*c*) £50 per annum for any installation of wireless telegraphy or telephony.

ROUMANIA

THE country was formed by the fusion of the two Principalities of Moldavia and Wallachia on December 23rd, 1861, and its first ruler was Colonel Cuza, who had, in 1859, been elected "Hospodar" or "Lord" of the two Principalities. He assumed the government under the title of Prince Alexandru Joan I. The total population is about six millions. Communication with this country is still so difficult and unsatisfactory that it has not yet been possible to obtain the text of any radiotelegraphic laws and regulations, but it is hoped to include these in our next edition.

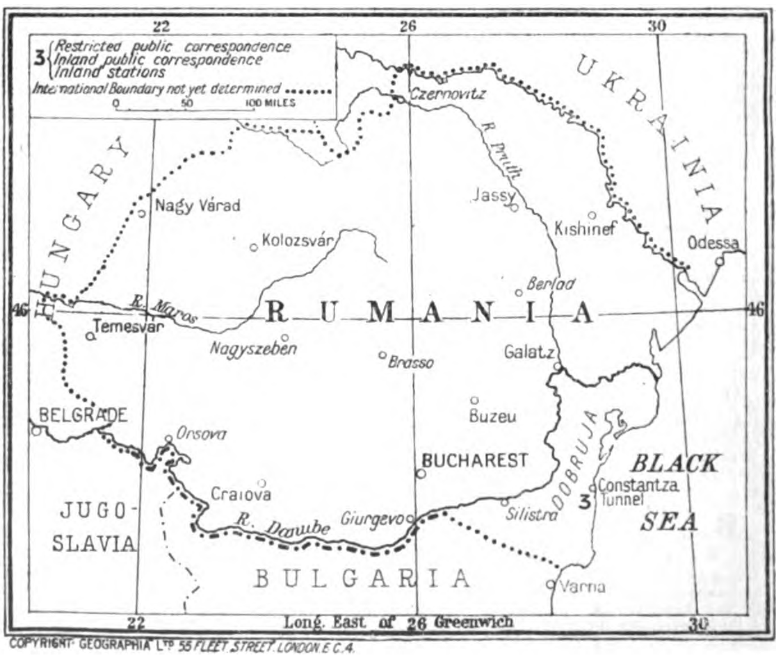
The existing wireless stations will be seen upon reference to the annexed map.

CONTROL.

The State alone may own wireless stations in Roumania. Authority to possess installations is, however, given to scientific institutions, and also to those engaging in special wireless research work.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
M. Emile Giurgea ..	Director of Herastreu (Bucharest) Wireless Station	Str. Renasterii 6, Bucharest
M. Nicolau Alexandre ..	Chief of the Wireless Station of Baneasa	Baneasa, Bucharest
Capt. Emile Geles ..	Chief of the Vaslui Wireless Station ..	Vaslui



The various classes of radiotelegraphic stations are :—

(1)—Stations for International correspondence—

Bucharest (Herastreu),
Bucharest (Baneasa), and
Vaslui (Moldavia).

(2)—Stations for Internal correspondence—

(i.) Military Mobile Stations.
(ii.) Ship Stations.
(iii.) Stations for the River Danube Service.
(iv.) Naval Stations.
(v.) Small Stations for Aviation Service.

ORGANISATION.

In 1915 Bucharest was cut off from telegraphic communication with the West, and an improvised wireless station of 8–10 kw. (50 cycles) was constructed from laboratory apparatus. A second station with an alternator (100 cycles) was also constructed in the Carol Park, Bucharest, by means of which communication was established with Athens, Rome and Paris. Several months later the Ministry of War constructed a new station of about 20 kw. (100 cycles), which only worked over small distances because shortly afterwards was erected at Herastreu (Bucharest), a 150 kw. station, system S.F.R. spark 1,000 cycles, with a horizontal antenna supported by eight towers 325 ft. high. At the same station there existed an S.F.R. installation of 15 kw. These two S.F.R. stations afforded excellent wireless communication until the evacuation of Bucharest in November, 1916, when the 15 kw. station was installed at Vaslui (Moldavia), where it is still located—and established communication with Salonica and the 150 kw. station at Botosani (North Moldavia), where it worked until the evacuation of the latter town (June, 1917). During the evacuation of Bucharest the Wireless Service was conducted by means of a 12kw. station constructed by the Roumanians and installed on three wagons. After the evacuation of Botosani, being unable to reinstall at Jassy the 150 kw. station on account of the lack of three-phase current necessary for the electric motors, an improvised station of 15 kw. was constructed, driven by an automobile motor, and which worked at Jassy until December, 1918, establishing communication with Paris, Lyons, Coltano, etc. In January, 1916, the original Jassy station was closed down and re-erected at Bucharest (Military Wireless Station of Baneasa). The principal station at Herastreu (Bucharest), which was destroyed during enemy occupation, is being rebuilt. The eight metal towers, which were carried off by the Armies of Occupation, are being replaced by eight others about 365 ft. high, of which seven are ready. Whilst awaiting the proximate reinstallation of the 150 kw. station, a new 15 kw. station has been constructed on the spark system (600 cycles). The installation will soon be completed by a 50 kw. arc set, and will be fitted for automatic transmission and reception.

Before the evacuation of Bucharest, wireless telegraphy in its relation to meteorology was carried out at the wireless station at Herastreu (Bucharest), and regular communication was instituted with the Meteorological Services of Paris, Salonica and Budapest. As soon as the wireless station of Herastreu (Bucharest) is re-opened, this Meteorological Service will be again inaugurated, and will be worked in conjunction with the aviation centres. When this happens all international powers will be taken for correspondence, the meteorological services, time signals, scientific research, etc.

ADMINISTRATION.

Roumania took part in the various International Radiotelegraphic Conferences. The laws concerning radiotelegraphy provide for articles established by Congress. The Radiotelegraphic Service is divided into four parts :—


I Public correspondence with ships
2 Naval Official Traffic
Government Traffic
English Miles
0 100 200 300
ARCTIC OCEAN
Novaya Zemlya
Vaigatch
Yougorski-Char
Murmansk
White Sea
Archangel
Arctic Circle
R. Pechora
R. Dvina
Gulf of Bothnia
Wiborg
L. Onega
L. Ladoga
Prest
Stockholm
Helsingfors
Hapsal
Reval
PETROGRAD
Kronstadt
Vologda
Perm
Yekaterinburg
BALTIC SEA
Rouno
Riga
Libau R.E.D.
Libau R.O.L.
R. Dvina
Dvinsk
Nishni Novgorod
R. Volga
Kazan
Moscow
RUSSIA
ASIA
Smolensk
Tula
Vilna
Samara
Orenburg
Warsaw
R. Dnieper
Kief
Saratof
R. Ural
Kharkof
R. Don
R. Dniester
Yekaterinoslaf
R. Volga
Taganrog
Kherson
Rostof
Rade de Taganrog
Odessa
Sea of Azof
Astrakhan
Rade d'Astrakhan
Fort d'Alexandrovsk
Sébastopol
Kerch
CASPIAN SEA
BLACK SEA
Pétrowsk Daghestan
Constantinople
Batum
Tiflis
Baku
Longitude East of Greenwich
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(*a*) International correspondence (Office of Posts and Telegraphs and Ministry of the Interior).

(*b*) Internal correspondence, Army (Specialist and Aviation Battalion).

(*c*) Navy.

(*d*) Mercantile Marine (Roumanian Maritime Service and Ministry of Public Works).

RUSSIA

UNTIL March, 1917, this vast area was administered by the late ex-Czar Nicholas II., who was descended, in the female line, from Michael Romanoff, elected Czar in 1613 after the extinction of the House of Rurik. At the date above referred to, the Russian Duma carried through a *coup d'état*, as a result of which Czar Nicholas abdicated.

ADMINISTRATION.

Wireless Telegraphy is very extensively used throughout these wide territories ; but we are not at present in a position to do more than reprint the old regulations. As far as can be ascertained, there are 18 wireless stations open for public service to ships and 19 for Government traffic only.

The following Statute and Regulations have been adopted for the institution of an inter-departmental Radiotelegraphic Committee :—

A—Statute.

B—Regulations.

C—Decree of February 20th, 1908.

Statute.

A 1. To establish the attached regulations concerning an inter-departmental Radiotelegraphic Committee and the necessary personnel.

2. To make Paragraph 1 effective as from July 1st, 1912.

3. To allot for the expenses of the said Committee (13,200 roubles annually) from the Imperial Treasury commencing from the year 1913 and to debit the expenses for 1912 (amounting to 6,600 roubles) to the anticipated surplus on the estimates for 1912.

Regulations.

B 1. An inter-departmental Committee is instituted for the co-ordination of the work of the various departments relating to the existence and use of the Imperial network of radio-telegraphic and radiotelephonic stations and for the consideration of schemes for the establishment and maintenance of radiotelegraphic and radiotelephonic communication which require preliminary discussion between the departments affected thereby.

This Committee is attached to the Headquarters Staff of the Postal Telegraph Department.

2. The Committee shall consist of a President and of permanent members appointed by the Ministries of the Interior, of War, or Marine, of Commerce and Industries, of Routes of Communication and of Foreign Affairs. When schemes for the establishment and exploitation of radiotelegraphic and radiotelephonic stations for the use of the Ministry of Finance or other departments are under consideration representatives of the department in question shall be appointed to attend the meetings of the Committee and have the right to vote.

When legal aspects of radiotelegraphic and radiotelephonic communication are under discussion a representative of the Ministry of Justice shall be invited to attend and shall have the right to vote.

3. The Ministers of the Interior, of War, of Marine, of Routes, of Communication, and of Commerce and Industries shall each appoint two members to the Committee and the Ministry of Foreign Affairs shall appoint one member

When necessary the Ministry of the Imperial Court shall appoint two representatives to attend the meetings of the Committee and the Ministry of Justice or other Ministries shall each appoint one member.

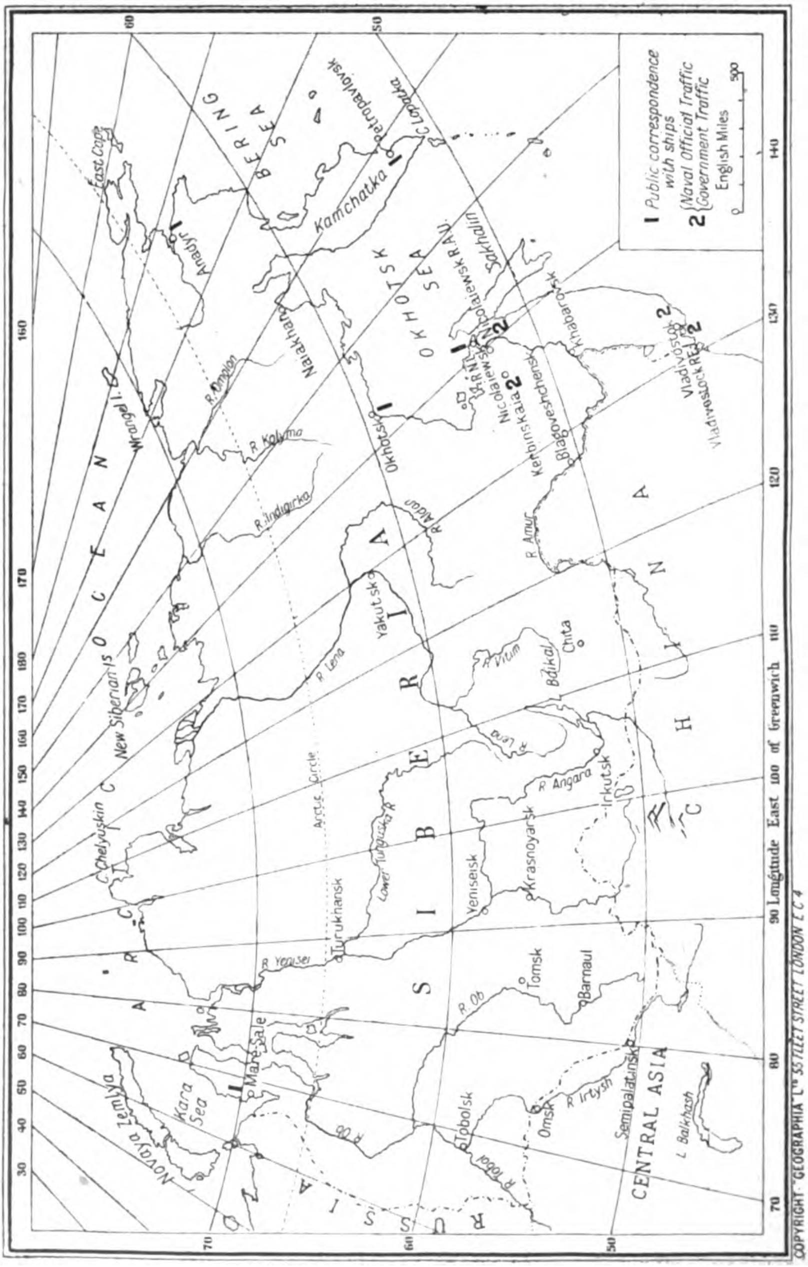
In the event of the representative of any of the Ministries being unable to attend the meetings of the Committee the Ministry in question may appoint a temporary substitute.

4. The President of the Committee and one of the permanent members of each department that furnishes two members must have special scientific and technical knowledge, and any temporary substitute appointed to represent these must be in possession of the same qualifications.

The President of the Committee shall be appointed by His Imperial Majesty on the recommendation of the aforesaid Ministers and the members of the Committee.

The members of the Committee can be appointed without any regard as to their rank.

During the absence of the President the fulfilment of his duties shall devolve upon one of the members appointed by the Ministry of the Interior.


1 Public correspondence with ships
2 {Naval Official Traffic / Government Traffic
English Miles
ARCTIC OCEAN
BERING SEA
OKHOTSK SEA
SIBERIA
RUSSIA
CHINA
CENTRAL ASIA
Kara Sea
Novaya Zemlya
New Siberian Is.
Wrangel I.
East Cape
C. Chelyuskin
Kamchatka
Sakhalin
Petropavlovsk
C. Lopatka
Anadyr
Nayakhan
Okhotsk
Nicolaievsk R.A.U.
Nicolaievsk
Nicolaievsk R.N.
Khabarovsk
Blagoveshchensk
Kerbinskaia
Vladivostok
Vladivostock R.E.
Yakutsk
Chita
Irkutsk
Krasnoyarsk
Yeniseisk
Turukhansk
Tomsk
Barnaul
Omsk
Semipalatinsk
Tobolsk
Mare-Sale
L. Balkhash
L. Baikal
R. Omolon
R. Kolyma
R. Indigirka
R. Aldan
R. Lena
R. Amur
R. Vitim
R. Angara
Lower Tunguska R.
R. Yenisei
R. Ob
R. Irtysh
R. Tobol
Arctic Circle
Longitude East 100 of Greenwich
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5. The duties of the Committee are as follows:—

(*a*) The examination of schemes which have been worked out by the various departments for radiotelegraphic and radiotelephonic installations with the object of co-ordinating them and of fitting them into a general plan for a network of radiotelegraphic and radiotelephonic stations through out Russia.

(*b*) The regulation of the mutual relations between the radiotelegraphic and radiotelephonic stations of different departments during their operations.

(*c*) The examination of matter relating to communication between ship and shore stations.

(*d*) The consideration of proposals made by various departments for the issue of new laws, rules, and regulations concerning radiotelegraphic and radiotelephonic communication.

(*e*) The preparation of materials and questions to be brought forward by Russia for discussion at International Radiotelegraphic and Radiotelephonic Conferences.

(*f*) The drafting of general technical regulations, rules, and standards relating to radiotelegraphic and radiotelephonic installations.

(*g*) The investigation of the general requirements of Russia in the matter of specialists in radiotelegraphy and telephony, and in the matter of their education and of the right to radiotelegraphic and radiotelephonic communication.

(*h*) Action as consultants in connection with questions concerning radiotelegraphic and radiotelephonic communications which may be referred to the Committee by various departments and particularly the examination of and reporting upon the practical value of new inventions relating to radiotelegraphy and radiotelephony.

(*i*) All other matters and questions concerning radiotelegraphic and radiotelephonic communication.

6. All matters and questions relating to radiotelegraphic and radiotelephonic communication enumerated in Sections (*a*) to (*e*) and (*h*) of the preceding paragraph (5) shall be brought forward by the various departments for the decision of the Committee.

Matters indicated in Sections (*f*), (*g*), and (*i*) of the same paragraph shall be examined by the Committee either on their own initiative or at the request of the departments interested.

7. Matters shall be submitted to the Committee in accordance with the instructions and resolutions of Ministers or Commanders-in-Chief in a complete form and with a definitely worded request from the department.

8. Communications between the President of the Committee and the Senate or the Chiefs of Headquarters or Chiefs of Departments or their subordinates or Governors shall be made in accordance with Clauses 233–236 of the Institution of Ministries.

9. For the preliminary technical consideration of complicated affairs the Committee shall be empowered to appoint, when required, special sub-committees consisting of members of the Committee who are particularly concerned in the matter and of well-informed persons who may be invited by the Committee and who will have the right to vote at the meeting of the sub-committees. At such meeting a member chosen by the Committee will preside.

10. For the carrying out of scientific and technical researches the Committee shall be permitted to use the laboratories of the Chamber of Weights and Measures and of other institutions in St. Petersburg, under conditions to be defined by special agreement between the Ministry of the Interior and other Ministries.

11. The final preparation and presentation of affairs to the Committee will be performed by one of the permanent members. Matters of a departmental character will be presented by a representative of the Ministry responsible for bringing the matter before the Committee for consideration.

12. The Committee will meet, by order of the President, at the Headquarters of the Postal Telegraph Department, not less than once per month, with the exception of the summer holiday-season, when meetings will be convened as required.

13. To form a quorum at meetings, the attendance is required of the representatives of the department which has introduced the business under discussion, and of at least one permanent member each from the Ministries of the Interior, of War, of Marine, and of Commerce and Industries.

14. All affairs in the Committee shall be decided by a simple majority of votes, each department having only one vote through its representatives. At meetings of sub-committees questions shall be decided by a simple majority of votes of all members of the sub-committee, including experts who may have been invited to attend the meetings.

In case of the votes of two parties being equal, the President shall give the casting vote.

15. In case of a department disagreeing with a decision of the Committee, the latter may, if they consider it necessary, refer the matter to the Council of Ministers.

16. In connection with each matter examined by the Committee a short protocol must be prepared, and signed at the same meeting by all members of the Committee who are present. Independently of the protocols detailed journals of the meetings will be kept and these will include the opinions of the Committee concerning the business under consideration. In case of a division of votes the protocol and the journal must contain the opinions both the majority and the minority, together with statement as to the Ministries which were included in each party.

17. The originals of journals and protocols will be kept with the documents of the Committee, but copies of the journals must be communicated within seven days to the Chiefs of Headquarters and to Chiefs of sections of those departments which are represented on the Committee.

18. The procedure to be followed in bringing matters before the Committee must be decided by the Committee and confirmed by the Minister of the Interior by agreement with other Ministers concerned.

19. The secretarial work in connection with the Committees shall be carried out by the secretary of the Committee, by his assistant, and by the officials allotted for the clerical work of the Committee.

20. The Secretary of the Committee shall be chosen by its President, whose choice must be confirmed by the Minister of the Interior. The appointment of the assistant secretary

is confirmed by the President of the Committee. Only persons who have received a University education and who have a technical knowledge of radiotelegraphy and radiotelephony will be qualified to hold such posts.

C The following are the principal provisions of the Decree concerning wireless telegraphy in Russia of February 20th, 1908:—

By a "radiotelegraphic station" is understood every installation designated for telegraphic communications and capable of producing on the spot or receiving from a distance electro-magnetic waves.

Stations of this kind comprise:—

(1) Stations designated for a special use.

(2) Stations designated for a general use, that is to say, open to accept telegrams from the public.

The form of administration, working, and supervision of radiotelegraphic stations are regulated by the personnel of the Telegraph Service, except in the case of the special and supplementary provisions to be eventually fixed.

The establishment of radiotelegraphic stations for public use and the general management of the Radiotelegraphic Service of the Empire are under the jurisdiction of the General Direction of Posts and Telegraphs. The various Government departments, having established radiotelegraphic stations for their special use, inform the General Direction of Posts and Telgraphs before opening the service at the named stations of their destination, power, range, and technical construction.

The carrying out by scientific associations and schools of public instruction of scientific experiments and researches in radiotelegraphy is subject to an authorisation, by special request, of the Minister for the Interior. These experiments, as well as the working of radiotelegraph stations for purposes of instruction, can be interdicted in cases where such experiments and instructions would exercise a harmful influence on neighbouring radiotelegraphic stations, or, in general, prejudice the interests of others.

Stations on board ships anchored in ports, or sailing near the coasts, are subjected to special regulations decreed by the Minister for the Interior in common accord with the Ministers of War, of the Marine, of Ways and Communications, of Foreign Affairs and of Commerce and Industry.

SAINT HELENA

THIS lonely little island, with an area of forty-seven square miles, in the South Atlantic lies about 800 miles from the nearest land (Ascension Island) and 1,200 miles from the West Coast of Africa. Its claim to fame rests upon the fact that it formed the place of exile of the great Napoleon.

St. Helena is an Admiralty coaling station and a resting place for the Eastern Telegraph Company's cable between Capetown and St. Vincent (Cape de Verdes). The wireless installation is open for public service with ships.

ADMINISTRATION.

Wireless Telegraphy is administered under the following Ordinance and Regulations:—

A—Wireless Telegraphy Ordinance, 1912.

B—Regulations.

ORDINANCE.

A The following Ordinance provides for the regulation of wireless telegraphy:—

1. From and after the passing of this Ordinance the Governor-in-Council may make regulations as he may deem requisite for regulating the use of wireless telegraphy on merchant ships whether British or foreign while in the territorial waters of this Colony.

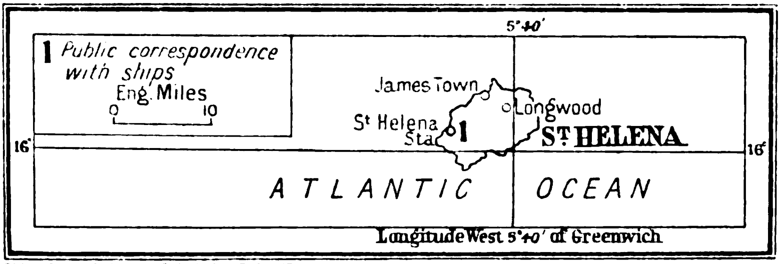
2. The Master of any ship and any person who shall act in contravention of any regulation now published or which may hereafter be published shall be liable on conviction to a penalty not exceeding ten pounds.

3. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

REGULATIONS.

B Made by the Governor-in-Council under Ordinance No. 7 of 1912, entitled "An Ordinance to provide for the Regulation of Wireless Telegraphy."

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of this Colony shall be worked in such a way as not to interfere with (*a*) naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.



2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of this Colony except with the special or general permission of the Governor.

3. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases as may be deemed desirable.

4. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

SAINT KITTS-NEVIS

(See Leeward Islands.)

SAINT LUCIA

(See map on p. 295.)

St. Lucia, lying 30 miles north-east of St. Vincent, possesses a total area of 233 square miles. One of the most notable features consists of a twin natural phenomenon known as the Pitons, great conical mountains, which lie at the mouth of Soufrière Bay. Castries, the capital, is on the western coast, near its northern extremity.

CONTROL AND ORGANISATION.

The wireless station, situated on the Morne Fortune overlooking the capital, was erected by the Admiralty in 1915, and is maintained and controlled by that Department. The officer in charge is a naval petty officer telegraphist and the operators are naval ratings.

ADMINISTRATION.

Wireless telegraphy is administered under an Ordinance of 1912 and various Regulations issued on its authority.

A—Wireless Telegraphy Ordinance, 1912.
B—Regulations of November 25th, 1912.
C—Regulations of August 24th, 1914.
D—Regulations affecting Ship Stations, June 9th, 1917.

WIRELESS TELEGRAPHY ORDINANCE
No. 10 of 1912.

A

This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1912.

2. In this Ordinance "wireless telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (*a*) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(*b*) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or Foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this Ordinance.

5. (*a*) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such

regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(*b*) The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(*c*) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any police officer or any person appointed in that behalf by the Chief of Police and named in the warrant, and a warrant so granted shall authorise the police officer or person named therein to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (*a*) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(*b*) Proceedings shall be taken before the First District Court on the complaint of the Chief of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. The Wireless Telegraph Ordinance, 1903, is hereby repealed.

SCHEDULE—SECTION 5 (2).

REGULATIONS PASSED NOVEMBER 25TH, 1912.

B All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with—

(*a*) Naval signalling, or

(*b*) The working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof; and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations establishes as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these regulations "naval signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and naval stations, or between a ship of His Majesty's Navy or a naval station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in charge or command of the ship.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

REGULATIONS PASSED AUGUST 24TH, 1914.

C Whereas by Section 5 (3) of the Wireless Telegraphy Ordinance, 1912, it is enacted that if at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time; and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

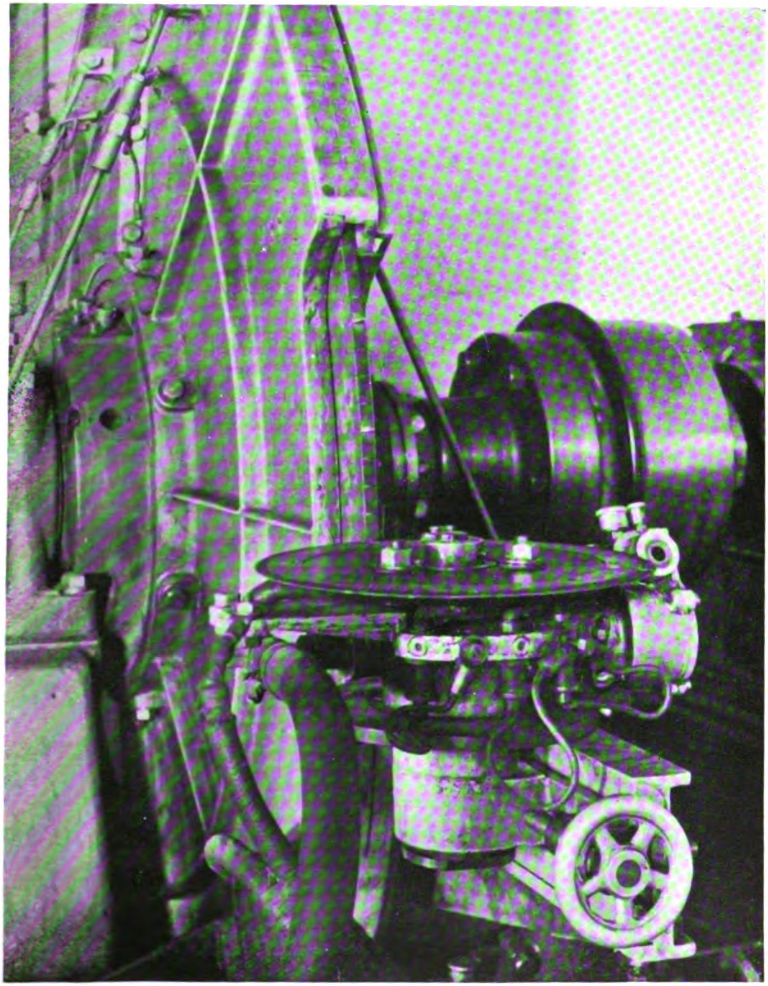
And whereas, in my opinion, such emergency as aforesaid has arisen:—

Now I (the Acting Administrator) do hereby make the following further Regulations, namely:—

1. The Governor may appoint any person to take possession and control of the apparatus for wireless telegraphy on board of any merchant ship while in the territorial waters o the Colony.

2. Any person so appointed may enter upon any such ship and take possession of the aforesaid apparatus thereon on behalf of His Majesty, and use the same for His Majesty's Service, and subject thereto for such ordinary services as to the said person may seem fit.

3. Any such person may instead of taking possession of such apparatus as aforesaid direct the master of the ship to submit or cause to be submitted to him all messages intended for transmission or arriving by the said apparatus or any class or classes of such messages, to stop or delay the transmission of any messages or deliver the same to him, and generally to obey all such directions with reference to the transmission of messages as such person may prescribe, and the master of the ship shall obey and conform to all such directions. Any master failing to obey and conform to any such direction shall be liable on summary conviction to the penalties provided under the Ordinance.



TRIGGER DISC OF C.W. TIMED SPARK DISCHARGER AT CARNARVON WIRELESS STATION.

[*To face page* 368

REGULATIONS MADE BY THE GOVERNOR.

OPERATION OF SHIP STATIONS WITHIN THE TERRITORIAL WATERS OF THE COLONY.

June 9th, 1917.

D 1. The radiotelegraph stations on board ships (other than His Majesty's ships of war or ships of war of his Allies) shall not be worked whilst such ships are within the territorial waters of the Colony.

2. For the proper enforcement of the above ships of British register in the territorial waters of the Colony must completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging in such a manner as to show they are properly disconnected.

3. Ships of foreign register in the territorial waters of the Colony must—subject to the provisions of the following Regulation 4—take down their aerial wires completely and disconnect the same from their radiotelegraph apparatus.

4. Ships of foreign register remaining in the territorial waters of the Colony for less than twelve hours may, at the discretion of the competent naval authority, or the person appointed by the Governor for the purpose, be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of Regulation 2 of these regulations.

SAINT VINCENT

ST. VINCENT, lying 30 miles south-west of St. Lucia and 97 miles west of Barbados, comprises an area of 140 square miles.

ADMINISTRATION.

Wireless telegraphy is administered under an Ordinance and Regulations which figure below.

A—Wireless Telegraphy Ordinance, 1913.

B—Regulations.

ORDINANCE.

A This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1913."

2. In this Ordinance "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. (1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor may determine, and shall contain the terms, conditions, and restrictions on and subject to which it is granted.

4. A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or foreign, while that ship is in the territorial waters of the Colony otherwise than in accordance with regulations under this Ordinance.

5. (1) The Governor in Council may from time to time make regulations for carrying into effect the purposes of this Ordinance, and such regulations shall on publication in the *Gazette* have the same effect as if enacted in this Ordinance.

(2) The Regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the Colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

6. If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance, or of any licence granted under this Ordinance, he may grant a search warrant to any Police Officer or any person appointed in that behalf by the Chief of Police and named in the warrant, and a warrant so granted shall authorise the Police Officer or person named therein to enter and inspect the station, place, or ship, and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

7. (1) Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

(2) Proceedings shall be taken before the Police Magistrate of the First District on the complaint of the Chief of Police or of any person thereto authorised by him in writing, and the procedure shall be the same as the procedure for the time being in force in respect of offences punishable on summary conviction.

8. "The Wireless Telegraph Ordinance, 1904," and "The Wireless Telegraph Amendment Ordinance, 1912," are hereby repealed.

REGULATIONS.

B 1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with—

(*a*) Naval signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these Regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. Regulations made by the Governor in Council on the 17th day of December, 1912, under the authority of the Wireless Telegraphy Ordinances, 1904 and 1912, are hereby repealed.

SALVADOR

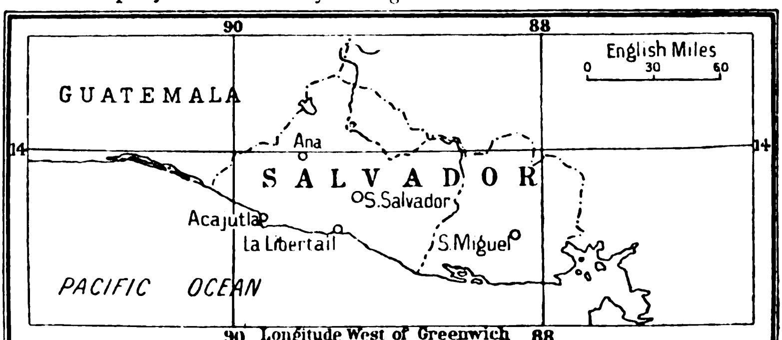
THE independent Republic of El Salvador is situated on the West Coast of Central America, and occupies an area estimated at 7,255 square miles. The population, according to the Census of 1914, numbers 1,254,151. It originated in the course of the dissolution of the Central American Federation (Guatemala, Salvador, Honduras, Nicaragua, and Costa Rica) which took place in 1839.

The form of Government is Republican, and there are three branches of Administration: (1) The Executive, which comprises the President, and Cabinet Ministers; (2) the Legislature or National Assembly; and (3) the Judiciary.

CONTROL AND ORGANISATION.

The first wireless station was erected by the Government and inaugurated in September, 1917. It is situated at the southern end of the city of San Salvador, near the military post "El Zapote." This is a private Government station, and is not open to public service. The station was presented to this Government by the Government of Mexico, and is known by the name of "Estaciön Venustiano Carranza."

Radiotelegraphy is not a State monopoly, private companies or individuals being allowed to erect or work wireless installations with the consent of the Government, provided that the present contract with the Cable Company be not thereby infringed.



OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Don Cecilio Bustamante	Minister of Public Works	San Salvador
Don Ricardo Posada	Director of Telegraphs	San Salvador

ADMINISTRATION.

At present there are no special laws regulating wireless telegraphy, and the only publication which deals with this subject is the *Revista Telegrafica*, the official organ issued by the Director-General of Posts and Telegraphs, wherein are reported any notices and items which affect the subject.

SAMOA ISLANDS

(See map on p. 334.)

SANTO DOMINGO (DOMINICAN REPUBLIC)

THE island of Santo Domingo is divided between two States, the Western being the Republic of Hayti, the Eastern the Republic of Santo Domingo. French is the official language of the former, Spanish of the latter. The first constitution of the Dominican Republic bears the date of November 18th, 1844 ; it has been amended several times and the one in force at present bears the date of February 22nd, 1908. The President administers the Executive, the Legislative functions devolving on a National Congress with two Chambers, the Senate and Càmara de Diputados (House of Deputies). The United States landed troops in May, 1916, and is supervising the administration for the present. The Republic covers an area of 50,000 square kilometres, and is divided into twelve provinces. The population is calculated at 700,000 inhabitants.

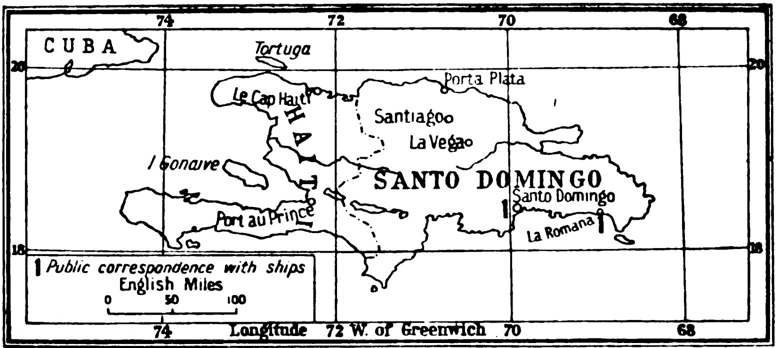
CONTROL.

The first land wireless station was erected at the capital city of San Domingo in 1908. The apparatus, supplied by the de Forest Company of New York, did not work satisfactorily, and despite the using of a power of 20 kw., only established irregular communication with Puerto Rico. After a lapse of five years, a 2-kw. set was installed in September, 1913, and regular public communication was instituted with Puerto Rico. In addition to this publicly owned station, there is a station at La Romana (in the Province of Seybo), owned by the (Sugar Refining) Central Guanica Company in Puerto Rico. The latter relays to the British Cable Company in Puerto Rico, and thus touch is maintained with the outside world. There is also another station open for public service with ships.

The supervision of the wireless service is under the control of the Superintendent of Telegraphs, who, in turn, is subordinate to the Director-General of Posts and Telegraphs, under the Department of " Fomento y Comunicaciones."

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
R. M. Warfield, Lieut.-Comdr. C.E.C., U.S. Navy	Officer in charge of the Department of " Fomento y Comunicaciones."	Government Palace, Santo Domingo City
E. H. Hathaway	Director-General of Posts and Telegraphs	Senate Building, Santo Domingo City
Dr. Eduardo R. Soler, C.E. ..	" Superintendent of Telegraphs " ..	Santo Domingo City
F. Lindemuth	Electrical Gunner, U.S.N.	Wireless Telegraph, Santo Domingo City
J. R. Saladin	Chief of Wireless and Telephone Station.	San Pedro de Macoris
Francisco Ortiz	Operator of Radio Station	San Pedro de Macoris



ORGANISATION.

In March, 1919, the two kilowat set in the Radio Station of Santo Domingo was replaced by a new set, which includes one Radio Transmitter "Marconi System," of 5 kilowats, 500 cycles, of 250 volts, alternating current.

Communication can now be made direct with San Juan, Porto Rico, without the intervention of the Ensenada Station. The transmission of messages *via* Ensenada is now assured by day as well as by night, excepting when there are electric disturbances. It is also possible to have direct communication with Guantanamo, Cuba, especially at night, and with Port-au-Prince, Haiti.

Two steel towers, each 225 feet high, have been erected for the antennæ, which are 500 feet in length.

A small station belonging to the Republic was installed on April 13th, 1914, at San Pedro de Macoris, a town on the southern coast of Santo Domingo. This is utilised for communication with the station at Santo Domingo City, with the Central Romano station, and with ships approaching the port.

ADMINISTRATION.

The only legislation on the subject of radiotelegraphy consists of a special law passed June 8th, 1911, and published in the *Official Gazette* No. 2207 of July 8th, 1911. This law exempts from taxation enterprises of public utility.

There is also in force a public contract with the Central Guanica and Central Romana (Sugar Refining) Companies, dated December 19th, 1913. This lays down the conditions under which the two companies conduct for the Dominican Government Public Radiotelegraphic Service through the medium of their stations.

Clause I. deals with the rates per word for foreign messages, which for the general public amounts to 30 cents per word.

Clause II. deals with radio rates in the island—8 cents per word.

Clause III. deals with special rates for officials of the States and the two companies, press rates, etc.

Clauses IV., V., and VI. deal with matters and methods of accounting.

SARAWAK

(See BRITISH NORTH BORNEO.)

SEYCHELLES ISLANDS

THIS Colony consists of a group of islands belonging to Great Britain, almost in the middle of the Indian Ocean, and 600 miles north-east of Madagascar. Formerly associated with Mauritius, the colony of Seychelles was at one time administered from that island; but in 1888 a special administrator was created, and the occupant of the post in 1903 was raised to the rank of Governor.

The principal island is Mahé (52½ square miles), and the Colony includes a number of dependent islands, which bring its total estimated area up to 156 square miles.

CONTROL AND ORGANISATION.

There are no private or commercial wireless installations. The only installation in the Colony was erected in 1915 at North-West Bay, Mahé, and belongs to the Admiralty.

There is no official of the Seychelles Government Service who is specially charged with the supervision of radiotelegraphy. Its control forms part of the general administration, of which the principal *personnel* will be found below.

Official.	*Title.*	*Address.*
Lieut.-Col. the Hon. Sir Eustace Fiennes, Bart.	Governor and Commander-in-Chief ..	Mahè
B. R. Logan	Chief Justice	Mahè
P. B. Petrides	Legal Adviser and Crown Prosecuter ..	Mahè
E. Taylor	Treasurer and Collector of Customs ..	Mahè
Dr. J. B. Addison, O.B.E.	Chief Medical Officer	Mahè
G. C. du Boulay	Private Secretary	Mahè

ADMINISTRATION.

Radiotelegraphy is administered under the Ordinances whose text will be found below, and which cancel "The Telegraphic and Electrical Stations Ordinance, 1903," printed in our former issues.

The list of current rules here included is as follows :—

A—Ordinance No. 3 of 1914.
B—Regulations (No. 52) thereunder.
C—Ordinance No. 11 of 1917.
D—Regulations (No. 127) thereunder.

ORDINANCE No. 3 OF 1914.
Dated February 19th, 1914.

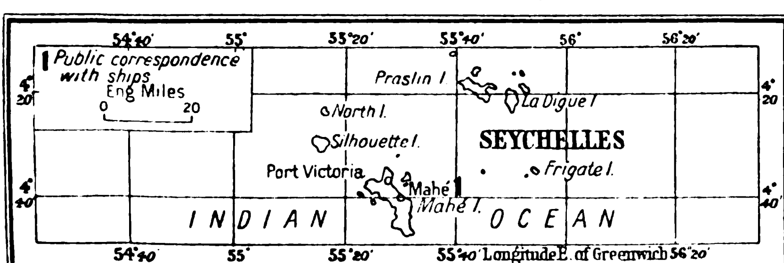
Enacted by the Governor of the Colony of Seychelles with the advice and consent of the Legislative Council thereof.

A To provide for the regulation of wireless telegraphy.

Be it enacted by the Governor of the Colony of Seychelles with the advice and consent of the Legislative Council thereof, as follows :—

1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1914."

2. In this Ordinance and in any regulation made thereunder the expression "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the



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messages or other communications are sent and received: Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may whenever he shall deem it expedient to do so licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor in Executive Council may determine and shall contain such terms conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding two thousand Rupees (Rs. 2,000) or to imprisonment for a term not exceeding twelve months and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence but no proceedings shall be taken against any person under this Ordinance without the previous sanction of the Crown Prosecutor.

(2) If the Chief Justice or the Police Magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any Police Officer to enter and inspect the station place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor in Executive Council may make regulations for all or any of the following matters:—

(i) for prescribing the form and manner in which applications for licence under this Ordinance are to be made;

(ii) for prescribing the fees payable on the grant of any licence

(iii) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship whether British or foreign in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established installed or worked in the Colony or the waters thereof and so as to not interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(iv) for prohibiting except with the special or general permission of the Postmaster of the Colony the working or using of any apparatus for wireless telegraphy on board a merchant ship whether British or foreign whilst such ship is in any of the harbours of the Colony;

(v) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships whether British or foreign in the waters of the Colony the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraph (iii) (iv) and (v) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted subject to such special terms, conditions and restrictions as the Governor may think proper but shall not be subject to any rent or royalty.

8. Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any regulations made thereunder or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance and for every such offence not otherwise specially provided for the offender shall in addition to the forfeiture of any articles seized be liable to a fine of one thousand Rupees (Rs. 1,000).

9. Ordinance No. 4 of 1903 is hereby repealed.

Regulations.

No. 52 of 1914.

B 1. Apparatus for wireless telegraphy on board a merchant ship shall not be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

2. Apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall not be worked in such a way as to interfere with—

(*a*) Naval signalling, or

(*b*) The working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

3. In these regulations "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Navy and Naval Stations, or between a ship of His Majesty's Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

4. For the purpose of any proceedings under

these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answerig signals of distress.

7. Any person who shall offend against any of these regulations shall be liable to a fine not exceeding five hundred Rupees and any apparatus for wireless telegraphy in connection with which the offence was committed may be seized and forfeited.

Made by His Excellency the Governor in Executive Council at a meeting held on the 7th day of May, 1914.

Ordinance No 11 of 1917.

An Ordinance to Amend Ordinance No. 3 of 1914.

Dated September 1st, 1917.

C Be it enacted by the Governor of the Colony of Seychelles by and with the advice and consent of the Legislative Council thereof, as follows :—

1. This Ordinance may be cited as "The Wireless Telegraphy (Amendment) Ordinance, 1917," and shall be construed as one with the Wireless Telegraphy Ordinance, 1914.

2. Section 6 (iv) of the Wireless Telegraphy Ordinance, 1914, is hereby repealed and replaced by the following :—

(iv) For prohibiting except with the general or special permission of the Governor, the working or using of any apparatus for wireless telegraphy on board any ship whether British or foreign other than His Majesty's ships of war, whilst such ship is in the waters of this Colony and for the control or disposal of any apparatus, instrument or thing which may be used in connection with wireless telegraphy on board any ship (other than His Majesty's ships of war) whilst such ship is in the waters of the Colony.

3. Section 6 (2) of the Wireless Telegraphy Ordinance, 1914, is hereby repealed.

4. (1) The Governor may appoint officers for the purpose of seeing that the provisions of the Wireless Telegraphy Ordinance, 1914, as amended by this Ordinance ,and any regulations made thereunder are complied with and it shall be lawful for such officers to go on board any ship whether British or foreign whilst any such ship is at anchor in the waters of the Colony to see that such provisions are complied with.

(2) If any such officer is molested, obstructed, hindered or insulted while in the execution of his duties an offence shall be deemed to have been committed.

5. For the purpose of any proceedings under the Wireless Telegraphy Ordinance, 1914, as amended by this Ordinance, or under any regulations made thereunder, the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship and for any breach of the Wireless Telegraphy Ordinance, 1914, as amended by this Ordinance, and any regulations made thereunder.

6. Any summons or other document in any proceedings under the Wireless Telegraphy Ordinance, 1914, as amended by this Ordinance, shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

7. The regulations published in *Gazette* No. 22 of 1914 under Government Notification No. 52 of 1914 are hereby repealed.

Passed in the Legislative Council at a meeting held on the 27th August, 1917.

Regulations.

No. 127 of 1917.

D 1. The radiotelegraph stations on board ships (other than His Majesty's ships of war) shall not be worked whilst such ships are within any harbour or bay of the Colony.

2. For the proper enforcement of section 1 of these regulations ships of British register in any harbour or bay of the Colony must completely disconnect their aerial wires from their radio apparatus, the ends of such wires being suspended entirely clear of the radiotelegraph cabin, preferably from the main rigging, in such a manner as to show they are properly disconnected.

3. (1) Ships of foreign register in any harbour or bay of this Colony must, subject to the provisions of sub-section 2 of this section, take down their aerial wires completely and disconnect the same from their radiotelegraph apparatus.

(2) Ships of foreign register remaining in a harbour or bay of this Colony for less than twelve hours may, at the discretion of the Governor, be permitted to leave their aerials up, provided the same are disconnected in accordance with the provisions of section 2 of these regulations.

4. Any officer appointed under the provisions of section 4 of Ordinance No. 11 of 1917 may order that the radiotelegraph cabin on board any ship (other than His Majesty's ships of war) be sealed and he shall thereupon affix his seal to such cabin.

If any seal so affixed is removed or tampered with an offence shall be deemed to have been committed against these regulations.

Made by His Excellency the Governor in Executive Council at a meeting held on the 24th day of September, 1917.

SIAM

THE Kingdom known to us as Siam, to the natives as Muang Ti, lies between British Burma and French Indo-China. Its integrity is guaranteed by France and Great Britain under mutual agreement. The form of government is an absolute monarchy with an Executive Council of Ministers and an European Adviser.



The total area of Siam (inclusive of all the islands) measures about 240,000 English square miles. The coast line of Siam extends approximately over 2,000 miles, and geographically Siam lies between 5° 40′ and 20° 20′ N. latitude, and between 97° 5′ and 105° 0′ E. longitude. The greatest distance east to west is estimated at about 510 miles, and that from north to south about 1,005 miles.

CONTROL.

Originally radiotelegraphy was organised in Siam under supervision of the Minister of Marine, but it is now controlled by the Ministry of Communications. The first stations erected were those at Saladeng in Bangkok (lat. 13° 44′ 32.49″ N., long. 100° 29′ 22.30″ E.), and at *Songkhlâ (lat. 7° 10′ 0″ N., long. 100° 36′ 12″ E.); both these land stations are directly controlled by Government.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Commander Luang Nava Vichitr ..	Head of Radiotelegraphic Department	Bangkok
Commander Luang Nava Vichitr ..	Chief Engineer, Wireless Station ..	Bangkok
Acting Senior Lieut. Khoon Shamnan Ukkikich	Asistant Engineer, Wireless Station ..	Bangkok
Sub-Lieut. Adh Thanu Singh	Principal Assistant	Bangkok
Sub-Lieut. Mee Pathma Navin ..	Principal Assistant	Bangkok

ORGANISATION.

There are experimental, amateur, and instructional stations at Saladeng. There are also ship stations on Government vessels.

* Sometimes spelt "Singora."

ADMINISTRATION.

The law under which radiotelegraphy is administered in Siam will be found below.

RADIOTELEGRAPH LAW.

This Law may be cited as "The Radiotelegraph Law, B.E. 2457." (1914)

2. It shall come into force from the date of its publication in the Government Gazette.

COAST AND LAND STATIONS.

3. The right to establish and work radio-stations for telegraphic and telephonic purposes on Siamese soil and on board ships permanently anchored in Siamese territorial waters is an exclusive privilege of the Government.

This privilege shall be reserved to the Department of Posts and Telegraphs in the Ministry of Communications.

4. The Army and Navy may establish and work independently radiotelegraph stations or field apparatus subject to such conditions as may be from time to time sanctioned in writing by the Minister of War or Marine.

Any station established under this section may be opened to public correspondence only under special arrangement with the Department of Posts and Telegraphs.

SHIP STATIONS.

5. No merchant ship under the Siamese flag shall establish or work any radiotelegraph or telephone apparatus without a licence from the Minister of Communications.

The Minister of Communications shall not grant such licence until he has been satisfied that the apparatus can work in accordance with the provisions of the International Radiotelegraph Convention of London, 5th July, 1912, and will be handled by qualified operators.

Such licence shall be for such time and subject to such conditions as the Minister of Communications may deem good.

6. No ship, whether under the Siamese or a foreign flag, excepting ships of war, is allowed while in Siamese territorial waters to send a message by means of her radiotelegraph apparatus when and where such message can be forwarded by the Government system, either with or without wires, except for the purpose of transmitting messages to or from a ship in distress.

SECRECY.

7. No person or persons engaged in or having knowledge of the operation of any radio-station shall disclose the contents of any message transmitted or received by such station for the purpose of transmission, except to the person to whom the same may be directed or his authorised agent, or to another station employed to forward such message to its destination, or in obedience to the directions of a Court of competent jurisdiction.

PENALTIES.

8. Whoever establishes or works any apparatus contrary to the provision of Sections 3 and 6, or in excess of the conditions laid down under Section 4 of this Law, shall be punished with imprisonment not exceeding six months or fine not exceeding five hundred ticals or both.

The captain or master of a ship, and the person directly responsible for the offence, if any, shall both be liable to punishment for every infringement of the provisions of Section 6.

9. Any person infringing Section 5 of this law shall be punished with fine not exceeding one hundred ticals.

10. Upon the conviction of any person of an offence under the foregoing sections, the Court may order the forfeiture of any apparatus used for the commission of such offence.

11. Any person injuring apparatus or committing any act of mischief to a radiotelegraph station lawfully established, or doing anything to prevent or intended to prevent the transmission or delivery of any radiotelegraph message by any such station, shall be guilty of an offence under Section 196 of the Penal Code.

12. Whoever commits any offence against Section 7 of this Law shall be punished under Section 279 to 281 of the Penal Code.

EXECUTION.

13. The Minister of Communications shall have charge and control of the execution of this Law.

It shall be lawful for him to frame regulations and to fix the scale of fees for land, coast, and ship charges in the transmission of messages by radiotelegraphy or telephony, as well as for licences under Section 5.

It shall also be lawful for him to frame regulations about the qualifications required from operators.

All such regulations shall be in accordance with the detailed Service Regulations appended to the International Radiotelegraph Convention.

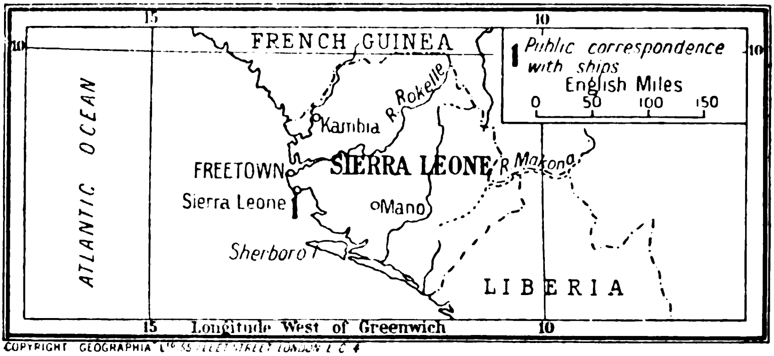
Such regulations, on being sanctioned by His Majesty and published in the Government Gazette, shall be deemed to be part of this Law.

Given on the 24th day of April, B.E., 2,457 (1914), being the 1,261st day of the Present Reign.

SIERRA LEONE

SIERRA LEONE proper consists of a peninsula about 26 miles long and 12 miles broad, covering an area of about 300 square miles. The Colony, however, is much more extensive, stretching from French Guinea on the north to the Republic of Liberia on the east and south-east; its total area being 4,000 square miles.

The capital is Freetown, and the Colonial administration is conducted by a Governor and Commander-in Chief, assisted by Executive and Legislative Councils. The same officials also administer the "Protectorate," a term which applies to the territories, not being portions of the Colony of Sierra Leone, lying between 6° and 10° north latitude and 10° and 14° of west longitude.



CONTROL.

A wireless telegraphy station is installed at Freetown, and is owned and controlled by the African Direct Telegraph Company.

The regulation of wireless telegraphy rests solely in the hands of the Government. There are no *wireless clubs* or *societies.*

ADMINISTRATION.

The Sierra Leone wireless laws and regulations were first formulated in the Decree of 1903, and the Schedule founded thereon. In 1912 this Decree and the regulations in the Schedule were amended by Ordinance No. 19 with the Schedule which was thereto attached. In the following year (1913) these were in their turn replaced by Ordinance No. 11 with its accompanying Schedule, both of which we print below. A set of Regulations issued on July 16th, 1917, has been superseded by an additional set issued on May 12th, 1919, which will be found below.

The list of reprints included here covers :—

A—Ordinance No. 11 of 1913.
B—Schedule dated May 23rd, 1913.
C—Regulation No. 1 of 1919.

AN ORDINANCE TO PROVIDE FOR THE REGULATION OF WIRELESS TELEGRAPHY.

No. 11 of 1913.

A BE IT ENACTED by the Governor of the Colony of Sierra Leone, with the advice and consent of the Legislative Council thereof as follows :—

1. *Short Title.*—This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1913.

2. *Definition of "Wireless Telegraphy"*—In this Ordinance, "Wireless Telegraphy" means any system of communication by telegraph without the aid of any wire connecting the points from and at which the messages or other communications are sent or received : Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. *Licence for Wireless Telegraphy.*—(1) A person shall not establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place or on board any ship registered in the colony, except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form nd for such period as the Governor may determine, and shall contain the terms, conditions and restrictions on and subject to which it is granted.

4. *Apparatus aboard ships to be worked in accordance with regulations.*—A person shall not work any apparatus for wireless telegraphy installed on any merchant ship, whether British or Foreign, while that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations under this Ordinance.

5. *Regulations.*—(1) The Governor may from time to time make regulations for carrying into effect the purposes of this Ordinance.

(2) *Schedule.*—The regulations in the Schedule to this Ordinance shall have effect except in so far as they may be amended or rescinded by regulations made under the authority of this section.

(3) If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships while in the territorial waters of the colony shall be subject to such further regulations as may be made by the Governor from time to time, and such regulations may prohibit or regulate such use in

all cases or in such cases as may be deemed desirable.

6. *Search Warrant.*—If a Magistrate is satisfied by information on oath that there is reasonable ground for suspecting that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any merchant ship without a licence in that behalf or contrary to the provisions of any regulations made under this Ordinance or of any licence granted under this Ordinance, he may grant a search warrant to any superior Officer of Police named in the warrant, and a warrant so granted shall authorise the Officer to enter and inspect the station, place, or ship, and to seize any apparatus which appears to be used or intended to be used for wireless telegraphy therein.

7. *Penalties.*—Any person who shall offend against any provision of this Ordinance or any of the regulations made thereunder shall be liable on summary conviction for every such offence to a fine not exceeding fifty pounds, and upon such conviction the Court may order that any apparatus for wireless telegraphy in connection with which the offence was committed shall be seized and forfeited.

8. *Repeal No.* 22 of 1903, *No.* 19 of 1912.—The Wireless Telegraphy Ordinance, 1903, and the Wireless Telegraphy Amendment Ordinance 1912, are hereby repealed.

SCHEDULE—SECTION 5 (2).

REGULATIONS.

B 1. All apparatus for Wireless Telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with

(*a*) Naval Signalling, or

(*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. In these Regulations, "Naval Signalling" means signalling by means of any system of wireless telegraphy between two or more ships of His Majesty's Navy, between ships of His Majesty's Naval Stations or between a ship of H.M. Navy or a Naval Station and any other wireless telegraph station whether on shore or on any ship.

3. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

4. For the purpose of any proceedings under these regulations the master or person being or appearing to be in command or charge of any ship shall be deemed to have authorised and to be responsible for the use or working of any apparatus on board such ship.

5. Any summons or other document in any proceedings under these regulations shall be deemed to have been duly served on the person to whom the same is addressed by being left on board the ship on which the offence is charged to have been committed with the person being or appearing to be in command or charge of the ship.

6. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

Passed in the Legislative Council this Twenty-third day of May in the year of our Lord, One thousand nine hundred and thirteen.

REGULATIONS (NO. 1 OF 1919) MADE UNDER SUB-SECTION (1) OF SECTION 5 OF THE WIRELESS TELEGRAPHY ORDINANCE, 1913 (NO. 11 OF 1913).

C Whereas by sub-section (1) of section 5 of the Wireless Telegraphy Ordinance, 1913 (No. 11 of 1913), it is provided that the Governor may from time to time make regulations for carrying into effect the purposes of the Ordinance:

And whereas by sub-section (2) of section 5 it is provided that the regulations made and passed by the Legislative Council, 23rd day of May, 1913, shall have effect except in so far as they shall be amended or rescinded by regulations made under the authority of the section:

And whereas by regulations made the 16th day of July, 1917, certain of the above recited regulations were rescinded and other regulations were substituted therefor:

And whereas I am minded to make other provision in lieu of the last above recited regulations:

Now, therefore, under and by virtue of the power and authority in that behalf vested in me it is ordered that the regulations made the 16th day of July, 1917, are hereby rescinded and the following substituted therefor:—

1. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used while such ship is in any harbour or bay of the Colony except with the special or general permission of the Governor.

2. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

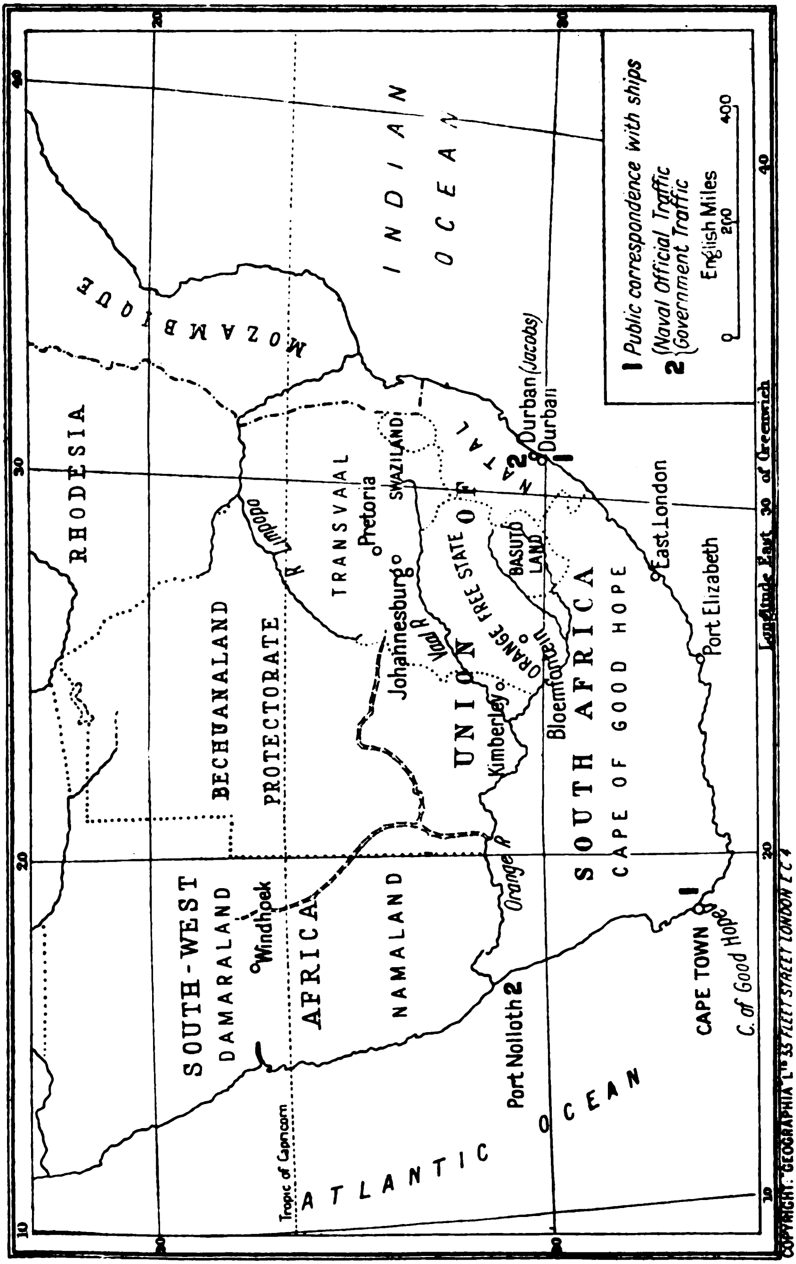
Made this 12th day of May, 1919.

SOLOMON ISLANDS

(See map on p. 334.)

SOUTH AFRICA (UNION OF)

THE Union of South Africa lies between 22° and 34° 50′ south latitude and 16° 30′ and 32° 40′ east longitude. Its total superficial area, not including the Protectorates of Bechuanaland, Basutoland, and Swaziland, which are included within the same geographical boundaries, but do not form part of the Union, is 473,075 square miles. The coast line extends from the mouth of the Orange River on the west coast to a point in latitude south


1 Public correspondence with ships
2 {Naval Official Traffic
Government Traffic
English Miles
0
200
400
RHODESIA
MOZAMBIQUE
INDIAN
OCEAN
BECHUANALAND
PROTECTORATE
TRANSVAAL
Pretoria
Johannesburg
SWAZILAND
R. Limpopo
Vaal R.
NATAL
Durban (Jacobs)
Durban
ORANGE FREE STATE
BASUTO LAND
Bloemfontein
Kimberley
UNION OF SOUTH AFRICA
CAPE OF GOOD HOPE
East London
Port Elizabeth
SOUTH-WEST AFRICA
DAMARALAND
Windhoek
NAMALAND
Orange R.
Port Nolloth 2
CAPE TOWN
C. of Good Hope
Tropic of Capricorn
ATLANTIC
OCEAN
Longitude East 30 of Greenwich
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26° 30′ on the east coast, and measures about 1,725 miles. The greatest distance east to west is a little under 900 miles, and north to south a little over 1,800 miles. At the last complete census, taken in 1911, the population was 1,276,242 Europeans, 4,019,006 natives, and 678,146 other coloured races. On May 5th, 1918, a census of the European population was taken. The preliminary unaudited result of the census shows that there were 730,179 males and 694,511 females, exclusive of persons absent on active service or work in connection with the war. The Union was constituted on May 31st, 1910, under the South Africa Act of 1909, and embraces the former separate self-governing colonies of the Cape of Good Hope, the Transvaal, the Orange Free State, and Natal.

The Executive Government is vested in a Governor-General appointed by the Crown, aided by an Executive Council of Union Ministers, with two Houses of Legislature.

CONTROL.

The administration of radiotelegraphy is in the hands of the Postmaster-General. It is directed by the Engineer-in-Chief of Posts and Telegraphs, and is not treated as a separate unit.

For Colonies working under the direction of the High Commissioner of South Africa (e.g., *Basutoland, etc.*)—*see under their own names.*

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. J. Wilson, C.M.G.	Postmaster-General	Cape Town
Mr. H. Twycross	Secretary	Do.
Lt.-Col. Norman Harrison, C.M.G., D.S.O.	Engineer-in-Chief	Do.
Mr. W. Hopkins	Controller of Stores	Do.
Mr. J. H. Weaver, O.B.E. ..	General Traffic Supt. (Telegraphs) ..	Do.
Mr. J. A. Dingwall, M.C. ..	General Traffic Supt. (Telephones)	Do.

ORGANISATION.

There are four wireless stations in South Africa, under the control of the Union Government. The first was established at Durban in June, 1910, and another at Slangkop, near Cape Town, in May, 1911. Both these stations send out daily weather reports and forecasts as well as a daily time signal. In September, 1913, it became necessary in connection with the port defences to remove the Durban station from the position where it had been originally erected to a point some four miles distant. The change of situation has not adversely affected its efficiency.

There are no privately owned stations, and in regard to licensing of private experimental wireless stations the matter is still under consideration. It is probable, however, that the Government will decide to put no obstacle in the way of facilities for private scientific research, while every application will be considered on its merits.

The latest available statistics are as follows :—

Land stations for public service to ships	... ...	2
Land stations for Government traffic only	... ...	2
Ship stations on privately owned vessels	... ...	4 low power.

ADMINISTRATION.

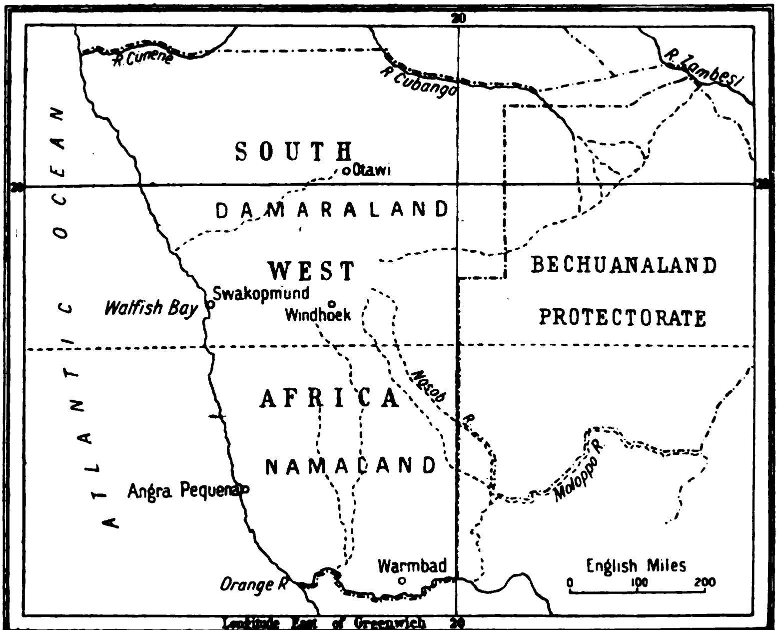
The only statutory regulation on radiotelegraphy within the Union is that contained in the preamble to the Post Office Act, and Section 80 *ibid.*, both of which will be found below.

No licences in terms of the section of the P.O. Act of 1911 are being issued under present conditions, and there are no private licensees for radiotelegraphy in existence except four in respect of certain ships. The licence follows the same lines as that issued in Great Britain.

There is no Union Act compelling ships trading in South African waters to be fitted with radiotelegraphic apparatus.

A—Statutory Regulation (Preamble to P.O. Act, 1911).

B—Section 80 of Post Office Act, 1911.



POST OFFICE ADMINISTRATION AND SHIPPING COMBINATION DISCOURAGEMENT ACT, 1911.

Chapter V.—Section 1.

A In this Act, unless inconsistent with the context, " telegraph " shall include " telephone," and shall mean any system or means of conveying signs, signals, sounds, or communications, by the agency of electricity, magnetism, electro-magnetism, or by any agency of a like nature, whether with or without the aid of wires, and shall include the system commonly known as wireless telegraphy, or ætheric signalling, and any improvements or developments of that system.

" Telegraph line " shall include any apparatus, instrument, pole, mast, standard, wire, pipe, tunnel, pneumatic or other tube, thing, or means whatever, which is or may be used in connection with or for the purpose of sending, transmitting, conveying, or receiving telegraphic signs, signals, sounds, or communications.

1. The Postmaster-General shall have the exclusive privilege of constructing and maintaining telegraph lines and of transmitting telegrams or other communications by telegraph within the Union or the territorial waters thereof, and of performing all the incidental services of receiving, collecting, or delivering telegrams or other such communications : Provided that—

(*a*) the owners of any system of railways may maintain and work for the purposes of any such railway, for the time and to the extent authorised by any law, any telegraph lines constructed in pursuance of rights conferred by that law ; and

(*b*) the Postmaster-General may construct, maintain, or lease telegraph lines for private use or may, by licence, authorise any person to construct, maintain, and work private telegraph lines within the Union or its territorial waters and may prescribe the fees and conditions therefor.

Post Office Administration Act, 1911.

B 80. (1) The Postmaster-General shall have the exclusive privilege of constructing and maintaining telegraph lines and of transmitting telegrams or other communications by telegraph within the Union or the territorial waters thereof and of performing all the incidental services of receiving, collecting, or delivering telegrams or other such communications : Provided that—

(*a*) the owners of any system of railways may maintain and work for the purpose of any such railway, for the time and to the extent authorised by any law, any telegraph lines constructed in pursuance of rights conferred by that law ; and

(*b*) the Postmaster-General may construct, maintain or lease telegraph lines for private use or may, by licence, authorise any person to construct, maintain and work private telegraph lines within the Union or its territorial waters and may prescribe the fees and conditions therefor.

(2) No telegraph line shall be used for the purpose of transmitting or delivering telegrams for the public except by the authority of the Postmaster-General and upon such terms and conditions as he may prescribe, and the department shall have the right, by means of its officers, of inspecting all offices which are authorised to accept, transmit, or deliver public telegrams.

SPAIN

THE present Constitution of Spain after having been drawn up by the Government and laid before a *Cortes Constituyentes* elected for its ratification, on March 27th, 1876, was proclaimed on June 30th of that year. It enacts that Spain shall be a Constitutional Monarchy, the Executive vested in the King, and the power to make laws "in the Cortes with the King." The reigning monarch, Alphonso XIII., belongs to the House of Bourbon, who succeeded to the Spanish throne at the end of the seventeenth century. He married Princess Victoria Eugenie, granddaughter of the late Queen Victoria, on May 31st, 1906.

The territory included under the Spanish administration comprises 49 provinces, 47 in the Iberian peninsula and 2 provinces, namely, Canary and Balearic Islands, and as colonies, Fernando Po Island, the Muni coast and Rio de Oro, and Ceuta and Melilla, in Morocco.

The superficial area of the 47 provinces in the Peninsula is 505,207.72 sq. km., the area of the Canaries is 7,272.60 sq. km., and the area of Balearic Islands 514.11 sq. km.

CONTROL.

Radiotelegraphy in Spain is a State monopoly, under the control of the Home Office and the Ministry of War and the Navy. The establishment of a wireless public service was granted on June 26th, 1908, to "La Sociedad Española Oerlikon," which was responsible for the erection of 24 land stations having three different ranges. The "Sociedad Española Oerlikon" then formed a company "Compañia Concesionaria del servicio público español de Telegrafia sin hilos," which erected the Cadiz, Tenerife, and Las Palmas stations, but did not complete them. The time granted in the contract having elapsed, the concession was then transferred to the actual holders of it, "La Compañia Nacional de Telegrafia sin hilos," which was formed with the aid, and under the direction of Marconi's Wireless Telegraph Company, Limited, and at the suggestion of the latter, the original plan was altered and reduced to 10 stations, all of greater range.

Licences for erecting and working wireless stations by private companies are not granted, except in the case of teaching or meteorological receiving stations. According to the latest statistics the following stations exist :—

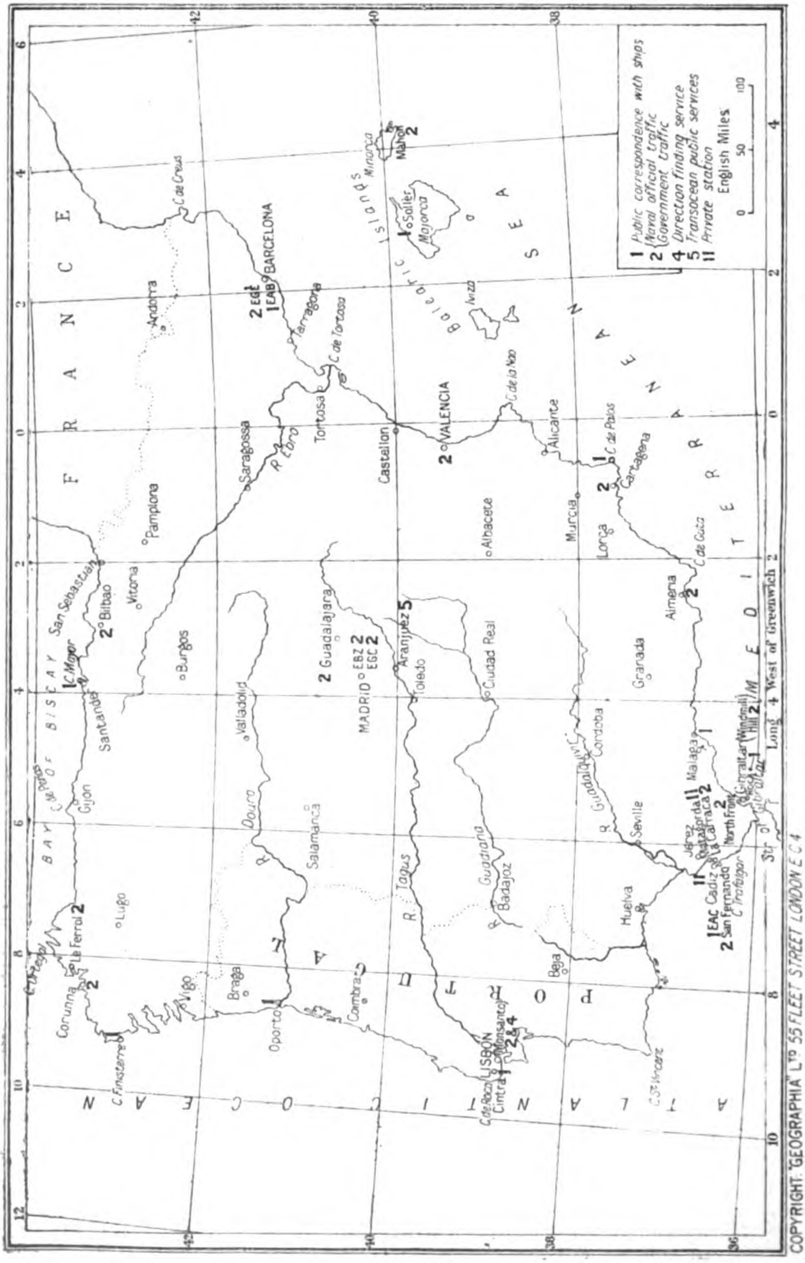
Meteorological observatories...	4
Official seismological stations	4
Educational stations	7
Stations open for public service to ships	8
Stations open for Government traffic only	13
Stations open for private traffic	2

There are no *experimental* stations and no *amateur* stations.

There is no special form of licence, and the geneal conditions subject to which these licences are granted can be found in the addition to article 6 of the Royal Decree of January 24th, 1908, which article was modified by Royal Decree of July 19th, 1914.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Excmo. Sr. Marqués de Alhucemas ..	Home Minister	Cuesta de St. Domingo 5
Excmo. Sr. Liut. General Don José Marina	War Minister	Zurbano, 6
Excmo. Sr. Vice-admiral Don Augusto Miranda	Navy Minister	—
Excmo. Sr. Juan I. Ruano	Director General of Ports and Telegraphs	Valverde, 26
Excmo. Sr. Don Enrique Fernández ..	Sub-director of Telegraphs	Imperial, 2
Sr. Don Vicente Calle	Head of Radiotelegraphic Service ..	Isabel la Católica, 13
Sr. Don Augusto Boyer	Second Chief	Alcalá, 133


1 Public correspondence with ships
2 Naval official traffic
Government traffic
4 Direction finding service
5 Transocean public services
11 Private station
English Miles
0
50
100
F R A N C E
BAY OF BISCAY
BARCELONA
VALENCIA
MADRID
LISBON
Balearic Islands
Minorca
Majorca
Iviza
Mahon
Soller
Andorra
Tarragona
C. de Tortosa
Tortosa
R. Ebro
Saragossa
Pamplona
San Sebastian
Bilbao
Vitoria
Burgos
C. Mayor
Santander
Gijon
C. de Peñas
C. Ortegal
Ferrol
Corunna
C. Finisterre
Lugo
Vigo
Braga
Oporto
Coimbra
Salamanca
Valladolid
R. Douro
Guadalajara
Aranjuez
Toledo
R. Tagus
Ciudad Real
Castellon
Albacete
Alicante
C. de la Nao
C. de Palos
Cartagena
Murcia
Lorca
C. de Gata
Almeria
Granada
Cordoba
R. Guadalquivir
Seville
Malaga
Gibraltar
North Front
Str. of Gibraltar
C. Trafalgar
San Fernando
Cadiz
La Carraca
Jerez
Huelva
Badajoz
R. Guadiana
Beja
Monsanto
Cintra
C. de Roca
C. St. Vincent
P O R T U G A L
A T L A N T I C O C E A N
M E D I T E R R A N E A N S E A
Long. 4 West of Greenwich
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The only company holding permission to work wireless for public service is the " Compañia Nacional de Telegrafia sin hilos."

The companies engaged up to the present in erecting wireless stations are the following: La Compañia Nacional de Telegrafia sin hilos (Marconi system), A.E.G. Thomson-Houston Ibérica (Telefunken), La Compañia Ibérica de Telecomunicación, Centro Electrotécnico (Army Department), and Military engineers (for military purposes).

ORGANISATION.

Radiotelegraphy has from its initiation in practice, attracted much attention and interest in the Iberian Peninsula.

As early as 1899 commissions were appointed in Spain which, from time to time, issued reports to their Government on the subject of Wireless Telegraphy. As a result, a Royal Decree of May 21st, 1905, appointed a permanent commission, presided over by the Chief of the General Staff and including representatives of the War Office, Admiralty and Home Office, thus anticipating the first International Conference concerning Wireless Telegraphy—*i.e.*, the one held in Berlin, 1906 (subsequently modified by the London International Convention of 1912).

Very little was actually done in regard to the erection of wireless telegraphic installations before 1906. Trials with unsatisfactory results had been carried out by the Army with field sets, and the Navy with stations on board the *Pelayo, Princesa de Asturias*, and *Giralda*.

Spain is one of the signatories of the important " Safety of Life at Sea " Convention and has become a party to all the international agreements affecting radiotelegraphy. She has, moreover, passed separate laws and regulations framed with the object of establishing and developing this applied science in the home country and in her dependencies.

ADMINISTRATION.

In the course of 1917 an important Royal Order was published by the Ministry of Marine, enacting that every merchant vessel of 500 tons and over must instal wireless telegraphy. The text of this Order will be found below together with the following current Rules and Regulations.

A—Law of October 26th, 1907.
B—General Rules, January 24th, 1908.
C—Regulations, January 24th, 1908.
D—Royal Order of September 4th, 1914.
E—Royal Decree dated February 20th, 1917.
F—Royal Order of June 22nd, 1917.
G—Decree dated October 12th, 1917.
H—Royal Decree of February 8th, 1917.

LAW OF OCTOBER 26TH, 1907.

THE GOVERNMENT OF SPAIN IS HEREBY AUTHORISED TO ESTABLISH AND DEVELOP THE WIRELESS, CABLE AND TELEPHONE SERVICES.

A H.M. Don Alfonso XIII. by the grace of God and by the Constitution, makes it known by these presents that Parliament has decreed and he, the King, has given his Royal assent to the following :—

ART. 1.—The Government is hereby authorised to establish and develop the wireless, cable and telephone services—availing itself of the co-operation of national institutions—by means of a Royal Order which will be published within four months from the promulgation of this law.

ART. 2.—The expenses entailed by each service will be covered by the takings of the concession itself. In the case of certain concessions, the proviso is reserved that the establishment may be taken over by the State in whole or part, by Royal Decree, should the so doing be considered as in the national interests.

ART. 3.—Concessions regarding these new services will be granted by public tender, and all necessary conditions must be fulfilled in order to safeguard the interests and security of the nation.

It is therefore decreed :

That all tribunals, magistrates, prefects, governors and all persons in authority, whether civil, military or ecclesiastical, whatever their rank and dignity, must obey and see to it that this law is observed in all its parts.

Given at the Royal Palace on October 26th 1907.

GENERAL RULES.

PROMULGATED BY ROYAL DECREE AS THE BASIS FOR THE ESTABLISHING OF WIRELESS SERVICE IN SPAIN.

B ART. 1.—The establishing and exploitation of all systems and apparatus available for the so-called " Hertzian telegraphy," " etherial telegraphy," and " radiotelegraphy," and all similar processes already invented or which may be invented in the future, shall be considered as

included among the State monopolies regarding all means of electrical communications.

ART. 2.—The establishing and exploitation of the above telegraphic systems shall be controlled by (1) the Minister of the Interior in all matters appertaining to the general civil applications of the said systems, and (2) by the Ministers of War and Marine when and where those applications are specially connected with national defence and with the army and navy.

ART. 3.—All other official departments requiring a radiotelegraphic service can erect wireless installations by previous agreement with the Minister of the Interior. Such installations will be under the regulations established for the regular wireless service and wireless experiments.

ART. 4.—No experiments with the above-mentioned systems can be instituted in the Peninsula, or in the Balearic and Canary Islands, or in Spain's African possessions, without the authority of the Ministers of War, Marine or Interior, according to the kind of experiment which it may be proposed to carry out. Such experiments and trials shall be carried out under the official inspection of the respective departments responsible, excepting only those of a technical character carried out by the personnel of the scientific institutions of the State. These shall be independent of the said departments, providing they adhere to the regulations laid down.

ART. 5.—The Minister on whose authority the above installations and experiments are established and effected must give notice thereof to the other Ministers, giving them also full particulars regarding their service and conditions.

ART. 6.—Acting in agreement with the Ministers of War and Marine, in the cases herein aforesaid, and acting independently in all other cases, the Minister of the Interior can authorise the installation of wireless stations, provided that none have been officially installed, when the said installations may have been applied for by individuals, societies, corporations or national institutions, subject to the following rules :—

(1) The applicant shall address himself in the first instance to the Minister of the Interior, stating clearly the place where the installation is to be erected, and supplying a plan of the building, together with the conditions and advantages of the locality.

(2) Such installations and the services they are expected to render shall be subject to the special rules and conditions laid down in each case, and to the general regulations established by the State for its own installations and wireless service.

(3) The Government shall have the right to close the service under extraordinary circumstances affecting the safety of the State and the maintenance of public order.

(4) The Government shall also have the right to acquire by purchase, whenever it may be considered convenient, and with the previous payment of an indemnity, the wireless installations hereinbefore mentioned, and the valuation for such compensation shall take into consideration the actual condition of the material and of the installation itself.

(5) The concessionnaire shall let the Minister of the Interior know, in good time, the date on which the station or stations will start working, in order to allow the personnel of the telegraph office the necessary time for their inspection.

(6) The petitioner must not consider himself entitled to proceed with the work of installation until the necessary authorisation has been granted.

The following rules were added by Decree of July 19th, 1914.

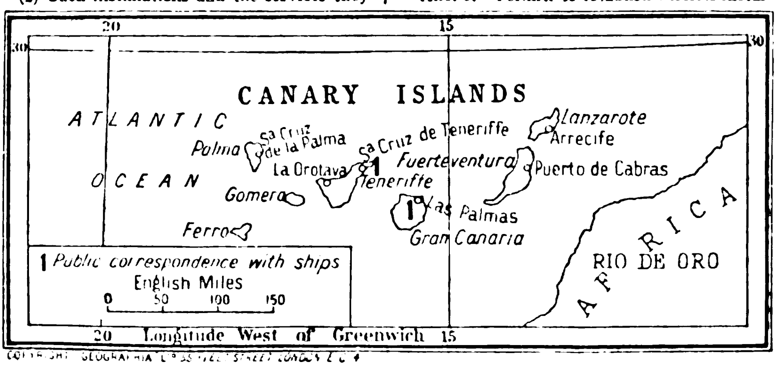
(7) If the stations are to be fitted up merely for the reception of messages and for scientific purposes, or to serve as auxiliaries to meteorological observatories, authorisation for the same can be obtained from the Minister of the Interior, provided that the application be made by an Official Institution, or by a private individual acting with the support of an Official Department.

(8) These receiving stations must be inspected by the Director of Telegraphs of the locality where they are installed.

(9) The persons appointed to carry out the reception must take an oath before the Civil Governor of the Provinces, to keep secret all information they may gather from the radio-telegraphic messages.

ART. 7.—The ships belonging to the national mercantile marine can install on board wireless stations worked on any of the wireless systems in current use, provided they obtain a special permit to do so from the Minister of Marine, who will grant it in accordance with the conditions established by the International Agreement and Service Regulations adopted in Berlin on November 3rd, 1906.

ART. 8.—Permits to establish wireless instal-



lations will not be granted to any private individual, society, or corporation, belonging to a foreign nationality.

Art. 9.—Any person or persons exploiting or using clandestinely any system of wireless, or any person or persons attempting to conduct wireless experiments with apparatus available for the purpose, will be prosecuted in conformity with the Penal Code, the general law, the military orders, or the administrative regulations, as the case may be. Prosecution for these offences will be carried out by the authorities entrusted with the administration of the said laws, orders and regulations; and the State will confiscate all material employed for such purposes.

Art. 10.—By agreement between the Ministers of War, Marine and Interior, the wireless stations which may be considered necessary and convenient for commerce, navigation and national defence will be erected on the sea board of the Iberian Peninsula, on the Balearic and Canary Islands, and in the African possessions of Spain.

These installations will be under the control of the aforesaid three Ministers, as the case may be, both in the matter of supplies and of personnel and offices, and they will form a part of the national telegraphic system.

This linking up of the wireless with the land telegraphic service will be effected by the ministerial department controlling the various wireless installations.

Art. 11.—Authorisation is hereby given for the interchange of messages between ships belonging to the national mercantile marine and those belonging to foreign nations carrying wireless installations of current systems, and also for the interchange of messages between the said ships and the coast stations already established or to be established by the Ministry of the Interior on the sea board of the Peninsula on the Balearic and Canary Islands, and in the Spanish possessions in Africa.

The Minister of the Interior shall determine the date of the inauguration, the extension and the class of service of each station.

Art. 12.—The Government shall have the option of refusing or accepting those wireless systems the details of which have not been made public.

Art. 13.—The State accepts no responsibility for the wireless service. In the cases of errors or of non-delivery of radiotelegrams the procedure followed will be as established in Art. 35 of the Berlin regulations.

Art. 14.—Whatever the object of the installations, the wireless service shall be organised, whenever possible, in such way as not to disturb other services of the same kind, or class. The ministerial departments interested shall adopt in each case such rules and regulations as may be found necessary, and shall also arrange regulations with other States regarding frontier installations.

Art. 15.—All wireless services, whether public, official, or private, carried on through the intermediary of land, coast and ship stations, shall be subject to the regulations hereunto attached.

Art. 16.—In addition to the rules herein contained, and those of the regulations mentioned in the previous article, the provisions affecting Radiotelegraphy contained in the International Convention made in Berlin on November 3rd, 1906, together with the Service Regulations appended thereto, must be observed.

Art. 17.—The Director-General of Posts and Telegraphs shall see to the fulfilment of the stipulations made by Art. 13 of the International Agreement and of those made by Art. 37 of the Berlin regulations, regarding the International Bureau established in Switzerland. The Ministers of War and Marine shall in accordance thereunto furnish the data required, which must be in the possession of the naval and military installations and stations and also data affecting the merchant ship stations, whose installations are authorised by the Minister of Marine.

Art. 18.—Messages received from or transmitted directly to a country or ship registered in a country which is not a signatory of the convention and regulations of Berlin, can only be admitted through the Spanish telegraphic system and through the coast wireless stations after a declaration has been made by the country in question expressing an intention of applying the rules laid down by the said convention, and their regulations regarding the regular routine of the messages and the security of the accounts. In their radiotelegraphic service the coast stations shall give preference to the service of those countries which have become parteis to the international agreements.

Articles 19 to 34 and the additional articles appended thereto deal with wireless installations on fortresses.

REGULATIONS.

Governing the working of the Wireless Stations in Spain.

General Service.

Art. 1.—All persons are allowed to make use of the wireless service, but the Government reserve to themselves the privilege of suspending for an indefinite period, as they may judge convenient, either every class of communication or such communications as belong to some particular class, or communications which affect some special station or stations.

Art. 2.—The following regulations and conditions laid down for the radiotelegraphic service in Spain, besides the provisions affecting radiotelegraphy contained in the International Convention made in Berlin on November 3rd, 1906, together with the Service Regulations appended thereto, shall be applied to all wireless stations, whether public, official or private, on the coast of the Peninsula, the Balearic and Canary Islands, the African possessions of Spain, and to all ships navigating those territorial waters.

Art. 3.—Ship stations shall be free to select their system of wireless installations; but for coast stations the administration shall adopt the system and equipment judged to be the best available from the point of view of scientific, technical and economic progress.

Art. 4.—All coast wireless stations shall be linked with the general telegraphic system, by means of private lines, in order to secure rapid communications.

Art. 5.—The working of wireless stations of all classes shall be carried out in such way that, as far as possible, no disturbance may be occasioned to other stations of the same kind.

Organisation of Wireless Stations.

Art. 6.—Wireless stations of all kinds must maintain reciprocal communications with the least possible waste of power.

Art. 7.—Wireless stations in Spain shall use the international signals of the Morse Code for the transmission of messages.

Art. 8.—All wireless installations in Spain, including both coast and ship stations, open to

the public, must carry on an interchange of messages irrespective of their wireless systems.

During the working hours fixed for each coast station the latter must receive the Morse signals and must also have a transmitter so disposed as to be able to reply in the signals of the same code.

ART. 9.—Coast wireless stations must accept and must give *absolute priority* to calls for help from ships in danger. They must, moreover, answer the said calls in the same order of priority and pass them on as urgent messages to the general telegraphic service.

ART. 10.—The administration shall establish three classes of stations—viz., public, official, and private. Those of the first class must have a radius of 600 kilometres and over, those of the second class one of 400 kilometres (there or thereabout), and those of the third class one of 200 kilometres. Exceptions may be made in accordance with practical experience in working.

ART. 11.—First class stations shall have three wave-lengths at their disposal—namely, one of 300 metres, another of 600 metres, and another which may reach the maximum length, but which must not be less than 1,600 metres. The last two will be used normally. The second and third class stations shall have two wave-lengths—namely, one of 300 metres and one of 600; and those of the second class will use normally the 600 metres wave-length, whilst those of the third class will use one of 300 metres, except in the cases referred to in Art. 14 final paragraph.

Coast stations situated near each other may maintain a special service between each other, provided that the distance between them allows of their doing so; but they must give preference to the Maritime Service. In the latter case, and for communications with national vessels on official matters, coast stations of both classes are allowed to use the special wave-lengths to which their installations are adapted or adaptable for these services.

ART. 12.—Ships belonging to the Spanish Merchant Service shall use a normal wave-lengths of 300 metres, but they can alter this to a maximum of 600 metres.

Only in exceptional cases are vessels of small tonnage allowed to use *normal waves* of less than 300 metres.

ART. 13.—The General Post and Telegraph Office shall publish and keep always up to date a Directory showing the coast and ship wireless stations authorised and open to the public; together with the following information:—

(1) Name and geographical position of the coast station; identification signal in the International Code, and the port of register of the ship fitted with wireless.

(2) Call letters. (These must be all different and must be formed by groups of three letters).

(3) Normal range.

(4) Wireless system adopted.

(5) The class of receiving apparatus, whether automatic or auditive, etc.

(6) Length of waves used by the station. (The normal wave must appear in italics.)

(7) Class of service rendered by the station. This covers such items as general communication, restricted communication (*i.e.*, communication with ships, with steamship companies, with ships fitted with apparatus of the same system, etc.); public long distance communications; communications of a private nature; special communications (*e.g.*, those of an exclusively official character), etc.

(8) Hours of service.

(9) Coast and ship station rates.

The Directory above-mentioned shall also include information regarding wireless stations not open to general public service and the existence of which has been made known to the International Bureau by the Spanish Administration.

ART. 14.—Wireless service in coast stations shall be, whenever possible, of a continuous nature, operating both night and day without interruption.

The Post and Telegraph Office shall fix, in each case, the hours of service of those stations where the service is limited.

Coast stations where the service is not of a continuous nature cannot close for the day without having transmitted all radiotelegrams to ships within their sphere of action and without having first received all the radiotelegrams advised by them. This proviso shall also apply in the case of ships signalling their presence before the closing hour of the station.

ART. 15.—Private corporations cannot install ship stations nor can they work any such station without Governmental authorisation. Permits in these cases will be issued in accordance with the provisions of the Berlin Convention and Regulations, by the Ministry of Marine, and will be communicated by the latter to the General Post and Telegraph Office.

Ship stations duly authorised must fulfil the following conditions:—

First.—The system employed must be a tuned system.

Second.—The speed, both for the reception and transmission of messages, must not under normal circumstances be less than twelve words per minute, allowing five letters to the word.

Third.—The power transmitted to the wireless apparatus must under normal circumstances, not exceed one killowatt. Nevertheless, greater power can be used if the ship is obliged to communicate over a distance exceeding 300 kilometres from the nearest coast station; or, if by reason of any interference, no communication can be established without increasing the power.

The service at the coast and ship stations shall be attended to by operators having their qualifying certificates issued by the General Post and Telegraph Office. This certificate must state the professional knowledge of the operator in the following matters:—

(*a*) Equipment of the apparatus.

(*b*) Auricular transmission and reception at a speed of not less than twenty words per minute.

(*c*) The knowledge of the regulations regarding interchange of wireless communications.

The qualifying certificate must also state that the Government has notified the operator that it is his duty to treat all communications as confidential.

Steamship companies are allowed to employ their own qualified operators provided they fulfil the conditions hereinbefore mentioned.

THE MAKING-OUT AND PRESENTATION OF MESSAGES.

ART. 16.—For the making-out and presentation of radiotelegrams the provisions of Articles 10, 11 and 33 of the Berlin Conference Regulations, in addition to the rules laid down in the following articles, shall be observed.

ART. 17.—Radiogram forms must have the words Radio Service on the heading.

On the transmission of messages from ship to coast stations no mention will be made of the date and hour of deposit.

On the re-transmission to the telegraph lines the coast stations shall note their own name as that of the station of origin, followed by the name of the ship, and shall register as the hour of transmission the time at which the radio was received by them.

ART. 18.—The instructions for delivery of messages destined for ships at sea must be as complete as possible. The form must be filled up as follows :—

First.—The name of the addressee with additional indications if necessary.

Second.—The ship's name as it appears in the Directory, adding her nationality, and if necessary, as in cases where there are two or more ships of the same name, adding also her identification letters in the International Code.

Third.—The coast station name as it is given in the Directory.

ART. 19.—The following messages will not be admitted :—

(1) Reply-paid messages.

(2) Money orders.

(3) Messages to be paid on delivery.

(4) Messages demanding acknowledgment of reception.

(5) Messages to be forwarded.

(6) Messages at special rates, except those for transmission on the telegraphic section or over-land wires.

(7) Messages marked "urgent" except on the over-land wired service, and then only with the reservation that the provisions of the international telegraphic regulations must be applied.

(8) Messages to be forwarded by post or express.

ART. 20.—The messages may be written in plain language or in code in accordance with the interior regulations for ordinary service and with the international conventions on the matter.

ART. 21.—The officials at the stations can ask the senders of wireless messages to prove their identity.

RATES AND EXECUTIVE REGULATIONS.

ART. 22.—In the counting of words in order to apply the rates the officials must follow the provisions of Articles 18, 19 and 20 of the International Telegraph Service Regulations as revised in London in 1903.

ART. 23.—In conformity with Article 10 of the Berlin International Convention, the total rate for wireless messages shall include

(1) The rate applicable to the maritime section, namely,

(*a*) the rate in force at the *coast station*.

(*b*) the rate in force at the *ship station*.

(2) The rate established for the over-land wired service, national or international, calculated in accordance with the general rules.

ART. 24.—The rate applicable to the maritime section is hereby fixed at 0·75 pesetas per word, of which 0·45 belongs to the coast station and 0·30 to the ship station.

With regard to the international service, in the case of messages to and from foreign ships, these rates shall be payable in francs, on the same basis.

The rate applicable to the over-land wired service, national or international, shall be calculated and allocated in accordance with the interior regulations and with the international regulations.

The minimum rate applicable to the maritime section of wireless messages is hereby fixed at 7·50 pesetas, which is the wireless rate for a radiogram of ten words.

ART. 25.—The coast station rate will be charged only once, even if the message goes through several coast stations.

ART. 26.—The whole cost of the radiotelegram must be paid by the sender, and at ship stations a tariff indicating this must be displayed.

ART. 27.—For the purposes of book-keeping the coast station must consider itself as addressee with regard to the messages coming from the telegraphic service on their way to ship stations; and the coast station must consider itself as the original office with regard to the messages coming from ship stations for transference to the telegraphic service.

ART. 28.—Coast and ship station rates shall be calculated in accordance with the number of words computed, and in accordance with Article 23 of these Regulations.

ART. 29.—Merchant ships at sea can interchange messages if they find it convenient. The rates to be charged in such cases shall be laid down by the respective owners and shall not be taken, into account by the National Administration.

ART. 30.—Ship stations on Spanish vessels shall send to those chartering them, upon their arrival in port, all documents in connection with and referring to all messages exchanged with coast stations. The charterers shall send such documents monthly to the General Post and Telegraph Office, where it will be kept for a minimum period of twelve months and where liquidation of the accounts must be made in due course.

ART. 31.—The installations on Spanish men-of-war shall use, in their communications with the coast stations open to the public, the wave-lengths which—under the terms of the Berlin Regulations—may be agreed upon between the Minister of Marine and the Minister of the Interior for the official service.

Both Spanish and foreign men-of-war can exchange private messages with the coast stations or with merchant ships; but only for the benefit of their crews. In such cases the technical and tariff provisions of these Regulations and those of the Berlin Convention and the Berlin International Regulations for the transmission of public correspondence, must be observed, as in the case of a merchant ship station open to the public. The regulations established to prevent the disturbance of wireless communications must be most carefully adhered to.

ART. 32.—When men-of-war exchange messages (private) with coast stations or with other ship installations they must follow the rules established for the computation of words and the collection of rates. In such cases the ship's purser in the Spanish vessels and the Minister of Marine shall respectively exercise similar functions to those assigned to the administration on board, and to the owner, as far as merchant ships are concerned.

In the calculation of coast and ship station rates for private service exchanged with foreign men-of-war, the General Post and Telegraph Office shall come to an understanding with the Administration of the country to which the said men-of-war belong.

ART. 33.—The same provisions shall hold good in the case of a military wireless installation, either permanent or portable, when the said installation utilises the stations estab-

lished by the Administration for Public Service.

ART. 34.—Should, by some accident, the Submarine Cable Service be substituted for the Wireless Service for the sending of a message, the former shall only receive the rate applicable to a coast station. If communication by wireless is established between two points in Spanish territory otherwise without telegraphic communication, the rates charged shall be those of the Interior Telegraphic Service, and the rules of that service shall apply, except in the cases provided for in Article 19 of these Regulations.

ART. 35.—In the matter of transmission of messages, of the signals to be employed in them, orders of transmission, calls, acknowledgments of receipt, instructions as to the route to be followed by the radiograms, and instruction as to their final destination, the provisions made in Articles 15 to 32, both inclusive, of the Berlin Regulations must be observed.

ART. 36.—In cases when the return of charges made for radiotelegrams has been justly established, the provisions of Article 35 of the Berlin Regulations must be observed.

BOOK-KEEPING.

In matters referring to book-keeping for the international wireless service the provisions of Article 36 of the Berlin Regulations must be observed.

GENERAL RULES.

ART. 38.—Coast stations, previously authorised by the General Post and Telegraph Office, shall furnish the authorised agents of Maritime Information Bureau with all such particulars concerning wrecks and disasters at sea as are of any interest to navigators, always provided that the said agents apply for such information.

ART. 39.—Authorised interchange of messages between ship stations on the high seas must be carried out in such a way as not to disturb the coast station's service. The latter shall have, as a general rule, the right of priority for Public Service.

ART. 40.—The order of transmission between ship stations on the high seas shall be settled by agreement between themselves.

The re-transmission of messages between ships at sea shall be arranged by agreement between the interested parties.

ART. 41.—The provisions of the International Telegraphic Regulations shall be applied by analogy, to radiotelegraphic communication as far as they are not antagonistic to these Regulations, or to the Convention, Additional Agreement, and the International Regulations of the Berlin Conference.

ART. 42.—The provisions of Articles 5, 6 and 9 of these Regulations shall apply to all classes of wireless installations, official and authorised, even if they are not open to Public Service.

Madrid, January 24th, 1908.

Approved by His Majesty the King.

—Maura.

(Seal.)

ROYAL ORDER OF SEPTEMBER 4TH, 1914.

D ART. 1.—According to the Royal Order of January 24th, 1908, the inspection and regulation of the Wireless Telegraph Service on board vessels of the Mercantile Marine are under the supervision of the Minister of the Navy, and by delegation to the Director-General of Fisheries and Merchant Shipping. The installations should fulfil all the requirements of the said Royal Order together with the rules and regulations of the London Radiotelegraph Convention of June, 1913, and the Rules of the Safety of Life at Sea Convention, January, 1914.

Everything affecting the service shall be controlled by the Navigation Department, which shall attend to the following matters :—

(1) The registration of all new installations authorised.

(2) The forwarding of all documents regarding such new installations accompanied by the order for their recognition.

(3) The sending of a report to the Home Office and War Office as to the result obtained from the various installations, together with indications of their characteristics.

To attend to this service the Director of Navigation and Fisheries will nominate a chief or a superintending official, together with five wireless inspectors on the coast, and this staff must have the qualifications as set forth in the Royal Order of May 21st last.

ART. 2.—The distribution of the staff on the coast and in the maritime provinces under each inspector shall be as follows :—

Barcelona.—Maritime provinces of Barcelona, Tarragona, Valencia, Mallorca and Minorca (the residence of the inspector being at Barcelona).

Cartagena.—Maritime provinces of Alicante, Cartagena, Almeria and Malaga, Melilla and Ceuta (the residence of the inspector being at Cartagena).

Cadiz.—Maritime provinces of Cadiz, Canary Islands and Huelva (the residence of the inspector being at Cadiz).

Vigo.—Maritime provinces of Vigo, Pontevedra, Villagarcia and Coruña (the residence of the inspector being at Vigo).

Bilbao.—Maritime provinces of Gijon-Santander, Bilbao and S. Sebastian (the residence of the inspector being at Bilbao).

ART. 3.—The wireless inspectors shall be under the orders of the Commandante de Marina of districts to which they are attached and in the ports of which they will have to make their annual inspection. They will only be allowed to leave their habitual place of residence when, for the convenience of the shipbuilders, they have to inspect a station in any other port in their district.

ART. 4.—The wireless inspectors must attend to the following duties :—

(*a*) To verify and inspect all new installations concerning which they may have been notified by the Director-General of Navigation and Fisheries that they are ready for public service, and to send in a report of the result of their verification and inspection.

(*b*) To visit annually the installations of such ships as are registered in the ports belonging to the districts within their jurisdiction, and to issue the necessary certificate according to the London Safety of Life at Sea Convention.

(*c*) To inspect foreign ship stations on board vessels which take passengers in Spain with the object of verifying that they are in possession of the certificate issued under the Safety of Life at Sea, which certificate must have been issued by the marine authorities of their respective countries.

(*d*) To report to the Director-General all remarks or complaints made by the shipowners, crew or passengers in regard to this service so that the aforesaid Director may take such necessary steps as he may think fit.

(*e*) To see that all the staff who work the

installations are in possession of the Government certificate according to the law of January 24th, 1908, with the object of making sure that all these installations are handled by duly qualified operators.

Art. 5.—For those duties a register book will be given to the wireless inspector in which he shall note the following particulars of each visit:—

(a) Date and place of inspection.
(b) Name of the vessel.
(c) System, radius, wave-lengths, etc.
(d) Names of operators and dates of their certificates.

A copy of this information is to be sent every quarter to the Director-General in order that he can make out a list and maintain a register devoted to all important information and data.

Art. 6.—The naval and marine authorities will do their best to facilitate the work of the inspector, putting at his disposal the *craft* and *personnel* required by him for the fulfilment of his duties.

Art. 7.—When it is desired to instal a wireless station on board a ship, the builder, the owner, the agent or the captain must ask for permission from the Director-General of Navigation and Fisheries. As soon as the installation is completed the applicant must notify the above authority, stating the port in which he desires the visit to be made, so that the wireless inspector may receive instructions accordingly.

Art. 8.—Wireless installations are subdivided into three classes:—

(1) Stations with permanent service.
(2) Stations with limited service.
(3) Stations with special service.

Class 1 includes all vessels which carry twenty-five or more passengers and which have an average speed of fifteen or more knots. This class includes also ships carrying 200 or more passengers, having a speed of over thirteen knots, and travelling a distance of over 500 miles between two consecutive ports. The latter vessels should carry at least two telegraphists.

To Class 2 belong all the steamers not included in Class 1, provided they are fitted to carry twenty-five passengers or more. During the voyage the ships of this class must have one telegraphist on constant watch during seven hours per day and ten minutes at the beginning of the other hours.

In cases where the vessel is more than 500 miles distant from the nearest coast, the watch must be permanent.

To Class 3 belong all ships which are not included in Classes 1 and 2, and having fifty or more persons on board and carrying less than twenty-five passengers or none.

The watch service on these ships must be continuously maintained during a transatlantic voyage or when the ship is over 1,000 miles distant from the coast. In special circumstances, and whenever advisable for the safety of life at sea, ships of every class may be obliged to keep a constant watch.

Vessels belonging to subsidised Government lines are obliged to carry wireless, no matter where they sail to or what crew they carry.

Art. 9.—The radius of the wireless station shall be a minimum of 100 miles at sea in daytime when communicating with ships under normal conditions and circumstances.

All the stations must be provided with an emergency set, installed on the upper deck, which must be kept in the best condition, having a source independent of the main electric supply and capable of being set in instant working order; this set must be able to work during six hours at least, and must possess a radius of a minimum of eighty miles for ships of the first class and fifty miles for the others.

Art. 10.—When testing the transmission and reception of messages, both installations shall be made to work with a ship at a distance of about 100 miles.

The wave-length and the oscillation current of the aerials must be measured.

When the Director-General thinks it necessary, the curves of resonance will have to be made and the degrees of coupling adjusted. When it is necessary to test the state of the receiving apparatus, the Director may order that one or several of the officers in that service shall make trial tests with the different stations at various distances during the voyage.

Art. 11.—Inspections must be made at the ports of Barcelona, Cartagena, Cadiz, Vigo and Bilbao, which are the places of residence of the wireless inspectors. However, if for the convenience of builders, the inspection should be carried out at some other port, these builders must defray the travelling expenses of the said inspector.

Art. 12.—The radio inspectors shall receive remuneration for all the inspections they carry out with regard to wireless installations.

The amount of this remuneration shall be 100 pesetas with an increase of twenty-five pesetas for each auxiliary transmitter which the ship may carry independent of the emergency installation. Such remuneration shall be the same whatever the rank held by the radio inspector.

The annual inspections held for the issue of certificates in accordance with the provisions of the London Safety of Life at Sea Convention shall be made free of charge.

(Signed) Ramon Estrada.
Director-General of Navigation and Marine Fisheries.

Madrid, September 4th, 1914.

ROYAL DECREE DATED FEBRUARY 20th, 1917.

Inscribed in the Official Record Under No. 49.

His Majesty the King (whom God save) inspired by the sentiment of humanity, of which the crews of the merchant ships, which in these difficult times with bravery and with risk to their lives maintain our maritime commerce are deserving, has, in accordance with the proposal of the Director-General of Navigation and Sea Fisheries, deigned to decree—

1. All merchant ships of 500 tons and upwards which make long sea voyages or long coasting voyages must carry a wireless installation having a minimum range of 100 miles, as laid down under the International Radiotelegraphic Convention.

2. Similarly the said ships will carry one or more lifeboats in proportion to the number of the crew, each fitted with its own motor, or provided with adjustable motors of such a kind as to answer the same purpose.

3. Local directors of navigation shall allow a certain time for each ship to be provided with these things, the shipowners having to certify before the said authorities that they have taken the necessary steps or made definite contracts to obtain them.

ROYAL DECREE DATED JUNE 22ND, 1917.

FIn view of the request made by the "Cia Nacional de Telegrafia sin Hilos," His Majesty the King (whom God guard) has been pleased to order that all the radiotelegraphic stations concerned in the Royal Decree of Feb. 20th last inscribed in the Official Record under No. 49 shall carry emergency installations in accordance with Article 9 of the regulations for the service of installation and inspection of radiotelegraphy on board merchant ships on September 4th, 1914, excepting those installations which have sources of energy independent of that which forms a regular part of the ship's equipment and is fitted on deck.

Madrid, June 22nd, 1917.

ROYAL DECREE DATED OCTOBER 12TH, 1917.

Issued in the Form of a Circular Published in the Official Gazette of the Spanish Ministry of Marine No. 235 of November 19th, 1917.

GIn view of the collection of information by this Administration for the fulfilment of the Royal Orders of February 20th and June 16th last (inserted in the Official Gazette of this Ministry and numbered 29 and 143 respectively) relative to the complete installation of wireless telegraphs on board merchant vessels of 500 tons and upwards, which are engaged in overseas and extended coasting trade, with a minimum range of 100 miles, on the conditions notified in the regulations governing wireless telegraphy.

And in view of the data recently communicated by the companies "A. E. G. Thomson Houston Iberica" and "Nacional de Telegrafia Sin Hilos," the former saying that its resources permit the construction of 25 stations per month and that within one year 300 can be provided, whilst the latter give an assurance that they are able to supply wireless stations with the least possible delay, but not defining the duration of this delay.

It resulting from previous communications from this Department that there are 57 stations already fitted and arranged for, and that there remain some 80 to be constructed or fitted.

It resulting, moreover, that this Administration deems a delay of eight months to be sufficient for the "Compania Nacional de Telegrafia Sin Hilos" to supply these 80 stations, that company being looked upon as a firm reputed in the business world as of good standing and with resources fully equal to those of the "A. E. G. Thomson Houston Iberica" and the delay of eight months being the double of that within which the latter undertake to fulfil those engagements.

His Majesty the King (whom God guard) in conformity with the information supplied by this Administration, and in agreement with his Privy Council, has thought it well to dispose that, beyond a delay of eight months from the date of publication of this Royal Order, the sailings of the ships mentioned in his Decree of February 20th of the present year shall be estopped if they fail to be fitted with complete wireless stations in accordance with the existing regulations, and that the Marine authorities in the provinces shall carefully communicate this decision to those who appear in their books as proprietors of the respective ships.

ROYAL DECREE OF FEBRUARY 8TH, 1917

HART. 1.—All civil private wireless stations, whether they be transmitting and receiving stations, receiving alone, or assigned for the use of scientific or auxiliary meteorological observatories, are subject to the inspection of the Government, such inspection being carried out by the Home Office and the general Direction of Posts and Telegraphs.

The inspection shall be carried out by telegraph officials, and its object is to promote public order and interest, and protect the rights of the communication monopoly that belong to the State, in fulfilment of the present dispositions on the matter and in strict observance of the concession conditions.

In accordance with the rights granted by contract with the State to the "Compañia Nacional de Telegrafia sin Hilos," this company can also perform the inspection of the above-mentioned wireless stations at her own expense.

The appointment of inspectors by the company shall be countersigned by the Postmaster-General, and when in performance of their duty will be treated as public officials and be granted the same facilities in the exercise of their duties as those given to the Government inspectors stated in Art. 3 and 4 of this Royal Decree.

The Home Office shall decide all questions which might arise in the carrying out of this private inspection.

ART. 2.—In addition to the inspection work which the Home Office or the Postmaster-General may at any moment judge convenient to carry out, a constant inspection service shall be carried out in the said civil radiotelegraphic stations under the Spanish State authorities.

ART. 3.—To carry out the constant inspection service stated in the preceding article, an inspector for each station shall be appointed by the Postmaster-General, who shall superintend the work, and the station shall not be used even for scientific purposes, except under his personal supervision. The inspector shall adopt such measures as he thinks fit to prevent the station being used during his absence.

When the working of a station cannot be attended to by one official alone, the Postmaster-General may assign two or more inspectors, and distribute between them the work of the station as he may judge convenient.

ART. 4.—Access will be allowed to the inspector of the station at any time of the day or of the night without need of permission, request, or notice of any kind.

For this purpose the keys of the place or places in which the apparatus is installed shall be given to the inspector by the owner or licensee of the station, so that no obstacle or delay may prevent his entrance.

ART. 5.—A weekly report of the general working condition of the station, stating the nature of the service, the day, hour, and minutes when they were effected, and any observation the inspector may judge should be specially noted, should be sent by him to the Telegraph Direction.

Immediate notice shall also be given by the inspector to the General Telegraph Direction of any technical or legal anomaly observed in the working of the station, and the orders of the authority shall be transmitted, executed, or caused to be executed by the said inspector.

ART. 6.—All applications for licence to

instal a radiotelegraphic station must comply with the following conditions, as well as with all others in force at the time :—

(1) The purpose for which the station is to be employed must be clearly expressed.

(2) A plan of the site where the station is to be installed, its communication with the public street or road, and the places where the apparatus are to be mounted in a 2 per cent. scale, and another plan with diagram of connections and details of aerial in a 10 per cent. scale, shall accompany the request for the licence.

(3) A detailed list of the apparatus specifying their nature, trade mark, and manufacture number (if any), must accompany the application.

(4) The name, age, address, and professional title (if in possession of one) of the operator or operators who will work the station must be stated.

The Home Office Minister can grant or refuse the concession of the licence, and can also modify the technical conditions of the installation before or after the licence has been granted.

Art. 7.—No modification either of the installation or disposition of the station is allowed without authorisation of the Home Office Minister acting on information of the appropriate inspector.

All modifications should be reported to the General Telegraph Direction by the inspector of the station.

Art. 8.—Before a station is opened the proprietor or licensee will deposit a sum of 5,000 pesetas in the general safe of deposits at the disposal of the Postmaster-General, and set aside to cover the pecuniary obligations which the proprietor or licensee might incur.

This sum must be replaced should it diminish or disappear in making good the obligations for which it is set aside.

Art. 9.—The proprietor or licensee must pay all expenses incurred by the official inspection. These expenses comprise a sum which will be fixed by the Postmaster-General, and which must not exceed 2,000 pesetas per annum, to be given to the inspector in monthly payments as a reward for his services, and in payment of all office expenses.

Office accommodation should also be provided for the inspector of the "Compañia Nacional de Telegrafia sin Hilos," should there be one.

Should there be no telegraph office in the place where the station is installed, the proprietor or licensee must provide decent food and lodging for both the official and private inspectors, should there be any.

Art. 10.—The General Direction will classify as major or minor offences any infringements by the proprietor or licensee or any of their staff of this Royal Decree or any other standing orders in this regard.

In all cases the following will be considered as a major offence :—

(1) Not fulfilling the conditions of the licence.

(2) Any modification in the installation or arrangement of the station without due authorisation of the Home Office.

(3) Deliberate obstruction of the inspector with regard to free access to the station under his charge.

(4) The using of the station for any service without the presence of the inspector.

(5) Infringement of the terms of Art. 8 of the Royal Decree.

Art. 11.—Apart from other criminal or civil responsibilities involved in the offences enumerated in the preceding article, the following penalties will be exacted :—

(a) Fine of 100 to 500 pesetas for petty offences.

(b) Fine of 501 to 2,000 pesetas for serious offences, together with loss of the licence and apparatus. The station will be dismantled at the General Direction of Telegraph's will.

The working of the station may be immediately suspended by the inspector on his discovery of any of the offences enumerated in numbers 1, 2, 3 and 4 of the preceding articles.

Art. 12.—Apart from other criminal responsibilities binding upon the inspector, acts of commission or omission infringing this Royal Decree or any other standing regulations on the matter will be considered as serious offences, and will be punished in accordance with the rules and regulations of the Post and Telegraph Corporation. Should the inspector not belong to the said corporation (*i.e.*, hold the rank of private inspector), the offence will be punished with the fine of 100 to 2,000 pesetas and disability from continuing in his office, the Compañia Nacional de Telegrafia sin Hilos being responsible for the payment of the fine.

Art. 13.—Any illicit station discovered shall be immediately dismantled, the General Direction taking possession of all apparatus. The proprietor and any other persons who may be found guilty of installing or working such a station shall, apart from other criminal responsibilities to which they be liable, be punished with a fine of 2,000 to 5,000 pesetas.

The owner of the building, director of the establishment, society, or corporation in whose premises a clandestine station is installed, and who, as soon as it comes to his knowledge, does not report the fact immediately in the quickest possible way to the General Direction, will incur the same responsibilities.

Art. 14.—Trial for these offences shall be held in public.

An informer shall be entitled to half of the amount of the imposed fine.

Art. 15.—The use of radiotelegraphy granted to official centres for scientific purposes and worked by public officials is not subject to constant inspection, and is excused the deposit referred to in Article 8. The service will not be suspended, nor the apparatus confiscated, should any infringement be committed by the licensee or staff : but the persons guilty of the offence shall be subject to the criminal or civil responsibilities which may personally affect them. A report will be sent in by the Minister of the Home Office to the Minister under whose supervision the station is administered of the offences committed, in order to assure the observance of this Royal Decree, and that these offences should be noted in the personal service records.

Art. 16.—The terms of the Royal Decree do not concern the "Compañia Nacional de Telegrafia sin Hilos" (except those which specifically affect this company), and the inspection of these stations will be subject to the conditions of the contract with the State.

Art. 17.—The authorisation for the working of radiotelegraphic stations granted with priority under the Royal Decree must be carried into effect. The General Direction of Telegraphs will immediately organise the constant

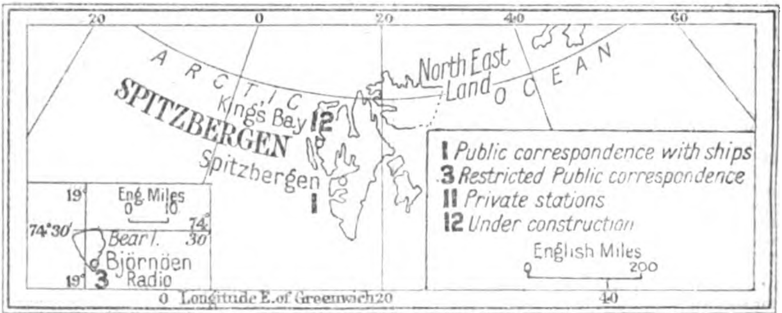
inspection service for the stations not comprised in Articles 15 and 16.

A term of eight days is granted from the date of publication of this Royal Decree for all private authorised existent stations to send in to the General Direction the information referred to in numbers 2, 3, and 4 of Article 6, and also make the deposit ordered in Article 9. If the term expires before the fulfilment of these obligations, the station will be considered as illicit, and immediate proceedings taken under Article 13, unless the licensee shall present before the expiration of the fixed term a renunciation of his licence to the Minister of the Home Office through the General Direction. He must as a preliminary thereto have dismantled the apparatus.

The same term of eight days is given to those in charge of existing radiotelegraphic stations to hand over to the General Direction the information asked for in numbers 2, 3 and 4 of Article 6. Should the term expire without the fulfilment of these conditions proceedings will be taken according to Article 15.

SPITZBERGEN

THIS group of barren islands, discovered by Barents in 1596, has formed the starting point for many expeditions in their endeavours to reach the North Pole. They lie in about 80° N. latitude, and between 10° and 30° E. longitude, and possess rich mineral resources. Several attempts have been made in recent years to open up the archipelago commercially, and with that object the Northern Exploration Company



was formed. This company owns two of the three wireless stations on the islands, situated respectively at King's Bay and Calypso Bay, whilst the third is owned and worked by the Norwegian Government. No laws and regulations yet exist regarding the working of radiotelegraphy, but as the territory has recently been placed under the suzerainty of Norway their proximate promulgation is to be expected.

STRAITS SETTLEMENTS

(See map on p. 129.)

THE Crown Colony of the Straits Settlements comprises Singapore, Penang, and Malacca. These settlements were transferred from the control of the Indian Government to that of the Secretary of State for the Colonies on April 1st, 1867. The Cocos Islands and Christmas Island have since been annexed to the Colony.

The administration is vested in the hands of a Governor, aided by an Executive Council, legislation being under the direction of a legislative Council, presided over by the Governor.

CONTROL AND ORGANISATION.

Commercial wireless telegraph stations have been erected at Paya Lebar, Singapore, opened for traffic on October 8th, 1915, and Penaga, Penang, opened for traffic on February 21st, 1916. These installations are Government land stations under the control of the Postmaster-General.

Wireless telegraphy is a State monopoly, and licences to erect and work stations are not issued to private companies or individuals.

There are no companies engaged in the manufacture of wireless apparatus, and no wireless societies, clubs, or publications. Arrangements have not yet been completed for the installation of aviation stations, and there are no wireless arrangements for the transmission of meteorological signals.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
F. M. Baddeley	Postmaster-General	Singapore
F. H. Dupree	Engineer Operator	Singapore
S. R. Drayton	Engineer Operator	Penang

ADMINISTRATION.

The administration of wireless telegraphy is regulated by the Wireless Telegraph Ordinance of 1912, together with the regulations issued thereunder, which are printed *in extenso* below.

A—Ordinance of December 16th, 1912.

B—Regulations of January 5th, 1914.

C—Regulations of April 1st, 1919.

Ordinance of December 16th, 1912.

A 1. This Ordinance may be cited as "The Wireless Telegraphy Ordinance, 1912."

2. The expression "wireless telegraphy" means any system of communication by telegraph as defined by "The Telegraph Ordinance, 1895," without the aid of any wire connecting the points from and at which the messages or other communications are sent or received:

Provided that nothing in this Ordinance shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

3. The Governor may, whenever he shall deem it expedient to do so, licence the establishment of any wireless telegraph station or the installation or working of any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony.

4. (1) No person shall establish any wireless telegraph station or instal or work any apparatus for wireless telegraphy in any place in the Colony or on board any British ship registered in the Colony except under and in accordance with a licence granted in that behalf by the Governor.

(2) Every such licence shall be in such form and for such period as the Governor in Council may determine, and shall contain such terms, conditions and restrictions on and subject to which the licence is granted as the Governor shall consider desirable in the public interest.

5. (1) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf he shall be liable to a fine not exceeding one thousand dollars or to imprisonment of either description for a term not exceeding twelve months, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Ordinance except with the previous sanction of the Public Prosecutor.

(2) If a magistrate is satisfied by information on oath that there is reasonable ground for believing that a wireless telegraph station has been established without a licence in that behalf or that any apparatus for wireless telegraphy has been installed, or worked in any place or on board any ship within the jurisdiction without a licence in that behalf he may grant a search warrant to any police officer to enter and inspect the station, place or ship and to seize any apparatus which appears to him to be used or intended to be used for wireless telegraphy therein.

6. (1) The Governor in Council may make regulations for all or any of the following matters:—

(i) For prescribing the form and manner in which applications for licences under this Ordinance are to be made;

(ii) for prescribing the fees payable on the grant of any licence;

(iii) for regulating the manner in which apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked so as to prevent interference with naval signalling or the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and so as not to interrupt or interfere with the transmission of any wireless messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea;

(iv) for prohibiting, except with the special or general permission of the Postmaster-General of the Colony, the working or using of any apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, whilst such ship is in any of the harbours of the Colony;

(v) for prohibiting or regulating in case at any time in the opinion of the Governor an emergency has arisen in which it

expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy on board merchant ships, whether British or foreign, in the waters of the Colony, the use of wireless telegraphy on board such ships while in such waters by such further rules as the Governor may see fit to make from time to time, and either in all cases or in such cases as may be deemed desirable.

(2) Provided that no regulations made in respect of the matters described in paragraphs (iii) (iv) and (v) of this section shall apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

7. When an applicant for a licence proves to the satisfaction of the Governor that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy a licence for that purpose shall be granted, subject to such special terms, conditions and restrictions as the Governor may think proper, but shall not be subject to any rent or royalty.

8. (1) Every omission or neglect to comply with and every act done or attempted to be done contrary to the provisions of this Ordinance or of any Regulation made thereunder, or in breach of the conditions and restrictions subject to or upon which any licence has been issued shall be deemed to be an offence against this Ordinance, and for every such offence not otherwise specially provided for the offender shall, in addition to the forfeiture of any articles seized, be liable to a fine of five hundred dollars.

(2) All convictions forfeitures and fines under this Ordinance or any Regulations made thereunder may be had and recovered before a district court.

REGULATIONS.

B The following Regulations, dated January 5th, 1914, were made under the "Wireless Telegraphy Ordinance, 1912":—

1. All apparatus for wireless telegraphy on board a merchant ship whether British or foreign in the waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraph station lawfully established, installed, or worked in the Colony or the waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship whether British or foreign shall be worked or used whilst such ship is in any of the harbours of the Colony except with the special or general permission of the Postmaster-General of the Colony.

3. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whether British or foreign while in the waters of the Colony shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

4. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

THE WIRELESS TELEGRAPHY ORDINANCE, 1912.

REGULATIONS UNDER.

C In exercise of the powers conferred by section 6 of the Wireless Telegraphy Ordinance, 1912, the Governor in Council is pleased to make the following regulations:—

1. All apparatus for wireless telegraphy on board a merchant ship, whether British or foreign, in the waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling, or (*b*) the working of any wireless telegraphy station lawfully established, installed, or worked in the Colony or the waters thereof, and in particular the said apparatus shall be so worked as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship whether British or foreign shall be worked or used whilst such ship is in any of the harbours of the Colony, except with the special or general permission of the Postmaster-General of the Colony.

3. If at any time, in the opinion of the Governor, an emergency has arisen in which it is expedient for the public service that His Majesty's Government should have control over the transmission of messages by wireless telegraphy, the use of the wireless telegraphy on board merchant ships whether British or foreign while in the waters of the Colony shall be subject to such further rules as may be made by the Governor from time to time, and such rules may prohibit or regulate such use in all cases or in such cases as may be deemed desirable.

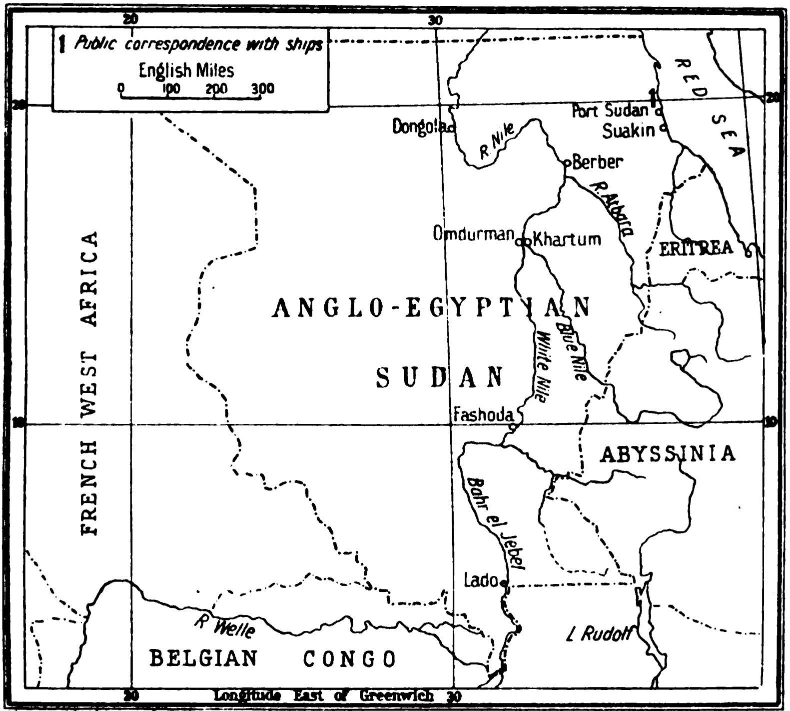
4. These Regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering signals of distress.

5. The Regulations made on the 30th December, 1918, and published as Notification No. 5 in the *Gazette* of the 3rd January, 1919, are hereby cancelled.

E. C. H. WOLFF,
Clerk of Councils.

SUDAN

THE immense territory known by the above name covers approximately 985,000 square miles and is situated immediately to the south of Egypt proper. It formed the locale of the war against the Khalifa in 1896–99, when the late Earl Kitchener overthrew this oppressive rebel and restored the country to a state of security and comparative peace. The population of the



Sudan is approximately 3½ millions. By a convention between the Egyptian and British Governments, signed at Cairo on January 19th, 1899, the administration of the territory south of the 22nd parallel of N. latitude lies in the hands of a Governor-General appointed by Egypt with the assent of Great Britain. All ordinances, laws and regulations are made by the Governor-General in Council.

ADMINISTRATION.

The Regulations affecting Radiotelegraphy in the Sudan are carried out under an Ordinance issued by General Sir Reginald Wingate, the late Governor-General, and dated at Khartoum, June 4th, 1906. It runs as follows :—

AN ORDINANCE FOR CONSTITUTING WIRELESS TELEGRAPHY A MONOPOLY OF GOVERNMENT.

No. 2 OF 1906.

This Ordinance may be cited as "The Wireless Telegraph Ordinance, 1906."

No person shall instal or make use of any apparatus for Wireless Telegraphy or transmit or receive messages by means of any such apparatus with the Sudan except the Department of Telegraphs or a duly authorised officer or official of the Sudan Government unless such person is in possession of a special licence in writing from the Governor-General.

SWEDEN

(See map on p. 329.)

THE territory of the Kingdom of Sweden includes the eastern and main part of the Scandinavian peninsula. In the extreme north and north-east Norway and Finland are her neighbours. The border on the Finnish frontier

is the Torne Elf, a river running from north to south, and falling into the northern end of the Gulf of Bothnia. Norway lies on the west of Sweden; and the Kiel, a chain of highland plateaus and mountains, forms the natural boundary thereof. The Kattegat to the south-west and the Baltic in a southerly and easterly direction separate her from the European continent.

The length of the country is estimated to be 2,500 kilometres from 69° north to 55° south latitude, and the size 450,600 square kilometres. Population about 6 millions.

Sweden is a constitutional monarchy. The Parliament consists of two chambers, of which the second chamber is directly elected by the people, and the first by the municipalities, in a somewhat indirect way.

The Cabinet is appointed by the King, and is supposed to be backed by a Parliamentary majority. The constitution rests on the fundamental law of 1809, revised in 1865.

CONTROL.

Wireless telegraphy, except in so far as the Navy is concerned, has been placed in the hands of the Kungliga Telegrafstyrelsen, which is a body under the supervision of the Minister of Public Works, and of which the Radio Bureau forms a special department.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Axel Schotte	Minister of Public Works	Stockholm
Mr. Sven Ludvig Herman Rydin	Director-General (Head of the Kungliga Telegrafstyrelsen)	Do.
Mr. S. Ljungquist	Chief of Radio Bureau	Do.
Mr. A. S. Litström	Inspector of Wireless Installations	Do.
Mr. J. G. Holmström	Director of Radiotelegraphic Instruction	Do.

The first land station in Sweden was organised and owned by the Swedish Navy. At present 5 land stations belong to the Royal Swedish Telegraph Administration, 2 to the Swedish Navy and one to the State Railways.

On January 1st, 1919, the Swedish Government took over permanently all wireless telegraphy in Sweden and on board Swedish merchant ships. Hitherto, the Société Anonyme Internationale de Télégraphie sans Fil in Brussels, controlling the Marconi as well as the Telefunken patents in Sweden, had a virtual monopoly in the Mercantile Marine, but by means of a friendly arrangement between the Swedish Government and the S.A.I.T., the former have acquired the patent rights of the latter.

No private companies, societies or individuals are permitted to work wireless telegraphy or erect stations without a concession from the Government. There are no wireless clubs or societies.

ORGANISATION.

Wireless telegraphy was first employed by the Swedish Navy in 1902, and was at the same time installed on the fortresses near Vaxholm, off Stockholm, on the Baltic coast. Wireless rapidly developed in the Navy, and only a few years after the first trials every ship was equipped. In 1904 a ship station and shore station were built in Karlskrona, but some years elapsed before wireless was introduced into the Mercantile Marine. In 1910 the s.s. *St. Paul*, of Gothenburg, was fitted with a Marconi installation, and soon afterwards there was much wireless activity amongst Swedish shipowners, so that by the end of 1919 some 83 ships of the Mercantile Marine were carrying wireless.

For ship and shore traffic there are stations at Boden, Göteborg, Hernösand, Karlskrona, Tingstäde on the Island of Gotland, and at Vaxholm, near Stockholm. An important 50-kilowatt station has been erected near Karlsborg,

and some more stations have been completed, but detailed particulars are not yet available.

LIST OF INSTALLATIONS.

Land stations for public traffic to ships	7
Land stations for restricted public traffic	2
Ship stations on Government vessels	51
Ship stations on privately owned vessels	83

ADMINISTRATION.

From the point of view of regulations, wireless telegraphy and telephony are controlled by the Act of August 31st, 1907, the contents of which have been published in previous issues of our Year-Book.

The following is the list of the texts of the Swedish Laws and Regulations which will be found appended hereto:

A—Act of August 31st, 1907.
B—Royal Decree of June 20th, 1913.
C—Resolution of Director-General of Telegraphs, August 22nd, 1913.
D—Extracts from Statute 131, dated August 10th, 1914, and Statute 514 of December 23rd, 1915.
E—Royal Decree, dated September 4th, 1916.
F—Resolution of Director-General of Telegraphs, dated January 12th, 1917.

ACT OF AUGUST 31ST, 1907.

A CONCERNING THE ESTABLISHMENT AND WORKING OF INSTALLATIONS OF RADIOTELEGRAPHY AND RADIOTELEPHONY.

1. Whosoever desires to establish in Sweden, on land, or on board a vessel permanently moored in Swedish waters, an electric installation of radiotelegraphy or radiotelephony for public or private use must apply for an authorisation from the King.

2. The authorisation of the King must likewise be applied for, by any person or persons desiring to establish on board a Swedish vessel other than permanently moored, an installation of the kind referred to in Paragraph 1.

3. The authorisation granted by the King, as prescribed in Paragraphs 1 and 2, can only be granted for a certain period. In granting the authorisation, His Majesty prescribes, under the reservation of private rights, the manner and conditions under which the installation may be established and worked.

4. Whosoever establishes or works, without the authorisation of the King or contrary to the provisions prescribed in the authorisation, an installation within the meaning of the present law, is liable to a fine of from 25 to 1,000 kronen if the penalty incurred by this contravention is not included in the Penal Code.

5. If an installation within the meaning of the present law has been established without the authorisation of the King, or contrary to the provisions prescribed simultaneously with the authorisation, or if the authorisation has been revoked later by the King, it is the duty of the Governors of Provinces to take the necessary steps to prevent any use being made of the installation.

6. Every fine imposed under the present law reverts to the State. Fines not paid on account of the insolvency of the delinquent are expurgated by terms of imprisonment as prescribed in the Penal Code.

7. The provisions of this law do not apply to State installations.

8. All regulations and all dispositions concerning foreign vessels not permanently moored in Swedish waters, which may be considered necessary for the proper working in Sweden of installations within the meaning of this Act, are made by the King.

ROYAL DECREE OF JUNE 20TH, 1913,

B WHICH CAME INTO FORCE ON JULY 1ST, 1913, REPLACING THAT OF AUGUST 31ST, 1907 (see YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, 1913, pp. 151–2).

1. The working of installations of radiotelegraphy or radiotelephony on board a foreign vessel not permanently moored in Swedish waters is, except in cases of distress, prohibited in those parts of the Swedish Archipelago and Swedish waters near to the coast stations which shall be designated by the Director-General of Telegraphs acting conjointly with the Admiralty.

It is the duty of the Director-General of Telegraphs, acting conjointly with the Admiralty, to communicate these provisions to navigators in the way he judges most convenient, and likewise to inform the Governors of the Provinces concerned.

2. In order to exploit such stations in a Swedish port on board foreign vessels above referred to a special authorisation of the General Direction of Telegraphs, acting in conjunction with the Admiralty, must be obtained; the parties interested shall furthermore be bound to conform to the instructions detailed edicts, if necessary, made by the Direction-General of Telegraphs.

3. When an installation of the kind referred to above is exploited on board one of the foreign ships above-mentioned, the interested parties, if no regulation exists to the contrary, shall conform to the instructions fixed by the International Radiotelegraphic Convention which are in force with the service regulations thereto annexed.

4. Every contravention of this Decree, or of the regulations prescribed by the Direction-General of Telegraphs in virtue of Article 2 above, will be subject to a fine of 25 to 1,000 kronen.

The fines revert to the State. Fines not payable by reason of the insolvency of the delinquent are expurgated by terms of imprisonment as laid down in the Penal Code.

5. The provisions of Article 4 hereof shall not apply to vessels of war.

C The following resolution made by the Director-General of Telegraphs relating to the prohibition of working radiotelegraphic and radiotelephonic installations in proximity to Swedish coast stations was issued on August 22nd, 1913 :—

In view of the Royal decision relating to the installing of wireless stations on board of certain Swedish vessels :

In view of the Royal Order of June 20th, 1913, relating to the working in Sweden of radiotelegraphic and radiotelephonic installations on board foreign vessels :

The Direction-General of Telegraphs, conjointly with the Admiralty, brings to the notice of interested parties that within a radius of ten nautical miles from the nearest Swedish coast station the operation of radiotelegraphic or radiotelephonic stations established either on board of Swedish vessels or on board of foreign vessels is prohibited during the hours when such coast station is open for traffic, except in cases of distress or for the purpose of corresponding with the nearest coast station.

This resolution does not refer to Swedish ships of war.

(*The above Regulation refers to the working of wireless stations on board foreign vessels only whilst they are within the territorial waters of the Swedish Kingdom.*)

EXTRACTS FROM STATUTES.

D In addition to the Acts and Regulations printed above, we include below such extracts from the 1914 and 1915 Statutes as apply to wireless telegraphy. These cover Regulations affecting Ship Stations and the various restrictions imposed on their use whilst within Swedish Territorial Waters.

SWEDISH STATUTES, 1914.

No. 131, DATED 10TH AUGUST, 1914.

His Royal Majesty's Gracious Rescript to H.M.'s Telegraph Department concerning prohibition of the use, within Swedish harbour precincts, of electric installations for wireless telegraphy or telephony on board of any vessel of a country at war.

In consequence of the outbreak of war between foreign powers, we have in connection with the provisions of Article 2 of our gracious proclamation of June 20th, 1913, concerning the use, within the confines of the realm, of electric installations for wireless telegraphy and telephony on board of foreign vessels, thought fit to ordain that until further notice it shall not be permitted to use such installations within Swedish harbour precincts on board of any vessel of a country at war. Which is hereby graciously brought to your notice for your cognisance and guidance.

SWEDISH STATUTES, 1915.

No. 514 OF 23RD DECEMBER.

Fifth Chapter.

Equipment of Vessels.

I.—Wireless Telegraph Installation.

ART. 56.

Vessels which must be provided with wireless installation.—Vessels which are used for voyages between different countries or between a country and any of its colonies, possessions or protectorates, shall be equipped with wireless telegraph installation, provided, however—

That such installation shall not be required if the vessel has fewer than 50 persons on board or if although the number on board is 50 or over, this is exclusively due to the fact that the master, by reason of sickness among the crew or through other compelling, unforeseen circumstances, has been obliged to supplement the crew, or has saved persons in distress at sea, or by reason of obligation, according to law, has taken with him seamen or other persons ;

And that the Board of Trade may, on application, grant exemption from the obligation of having such installation, if the Board, in view of the route or other circumstances concerning the voyage, finds that such installation is not necessary and if such application concerns :—

(*a*) Vessels which do not go out to a distance of more than 150 nautical miles from the nearest coast ;

(*b*) Vessels which only in exceptional cases and incidentally have 50 persons or more on board for the reason that they take stowers or stowage labourers with them on a certain part of the voyage, and which on the one hand do not sail from one continent to another, and on the other hand are, during the said part of the voyage, between 30° northern and 30° southern latitude ; or

(*c*) Sailing vessels which are of rather primitive construction and which it is practically impossible to equip with wireless installation.

ART. 57.

Concession and classes of vessels.—Concerning H.M.'s permission to carry out such installation as referred to in Art. 56, separate enactments have been issued.

In sanctioning such installation as aforesaid the King will fix the class in which the vessel shall be classified, in accordance with the nature of the attendance of the wireless telegraph station.

ART. 58.

Range of the installation.—The wireless installation shall be sufficiently powerful to be able to transmit in day-time, under normal conditions, signals which can be clearly distinguished at a distance of at least 100 nautical miles from the vessel.

ART. 59.

Spare installation.—Vessels which are to be equipped with wireless installation shall have a spare wireless plant. This shall be placed wholly and entirely in the upper parts of the vessel, as high up as possible, and all its parts shall be fitted up so as to be protected as much as possible.

The spare plant shall have a source of power which is exclusively intended for the



COLOMBO WIRELESS STATION, CEYLON, SHOWING T AERIAL.

[To face page 400

spare plant, and which can be brought into action most speedily.

The source of power referred to in the second paragraph of this article shall be capable of acting for at least six hours with a minimum range of 80 nautical miles in the case of vessels, for which uninterrupted attendance of the wireless installation shall have been provided, and of 50 nautical miles in the case of any other vessel.

If the main installation meets the requirements of the first and second paragraphs hereof as regards the spare plant the spare installation shall not be required.

ROYAL DECREE OF SEPTEMBER 4TH, 1916.

E 1. When circumstances so demand the captain of a Swedish Government ship of war is entitled to prohibit the use of wireless electrical telegraph or telephone on board merchant vessels, whether they be Swedish or foreign, so long as they remain in Swedish territorial waters.

And the warship captain is moreover entitled, if it seem necessary for the observance of his order under the rule, to instruct the lowering of the antennæ.

In case the aforesaid captain has not prescribed a specific period during which the prohibition against using the wireless installation shall remain in force, the installation may be used and the antennæ be hoisted, as soon as the warship is out of range for exchanging visual signals with the merchant vessels.

2. The captain of a merchant vessel who shall violate this rule, or omit to obey any order given in accordance with Par. 1, shall be liable to a fine ranging from 25 to 1,000 kronen.

RESOLUTION OF DIRECTOR-GENERAL OF TELEGRAPHS, DATED JANUARY 12TH, 1917.

F Referring to His Majesty's resolutions conferring concessions on certain Swedish vessels for the carrying of wireless telegraphic apparatus, and to His Majesty's Decree of June 20th, 1913, regulating the use within the Swedish Realm of wireless telegraph or telephone on the part of foreign vessels, the K. Telegrafstyrelsen (in consultation with the Admiralty) desires to make public proclamation that :—

The prohibition, affecting both Swedish and foreign ships, against utilisation of electrical wireless installations, both telegraphic and telephonic, published in the Decree of the K. Telegrafstyrelsen of the 22nd August, 1913 shall be extended to include the whole Swedish archipelago. The only exception to this rule shall be made in favour of foreign vessels in case of distress, and in favour of Swedish vessels which find themselves in a similar predicament, or which may desire to exchange, receive or transmit messages with, from, or to, a Swedish coast station.

SWITZERLAND.

THE Swiss Confederation is made up of the union of twenty-five separate political entities, or republics, organised into twenty-two cantons.

The area comprises 15,976 square miles, the population (according to the census of July 1st, 1915) numbers 3,880,500. The country extends from 45° 0′ to 48° 0′ north latitude, its longitude lying between 5° 0′ and 11° 0′ east of Greenwich. The length from north to south is 137 miles, the width from east to west 216 miles ; the furthest points on its boundary are 223 miles apart.

The first Federal Organisation dates from September 12th, 1848, and the present Constitution came into force on May 29th, 1874. Supreme authority is exercised by the Federal Assembly, which consists of two Councils —the *Ständerath* or State Council, and the *Nationalrath* or National Council. The latter, which represents the Swiss people in its totality, consists of triennially elected members, each member representing a population of 20,000. The Ständerath (consisting of forty-four Deputies) represents the cantons, each canton contributing two members.

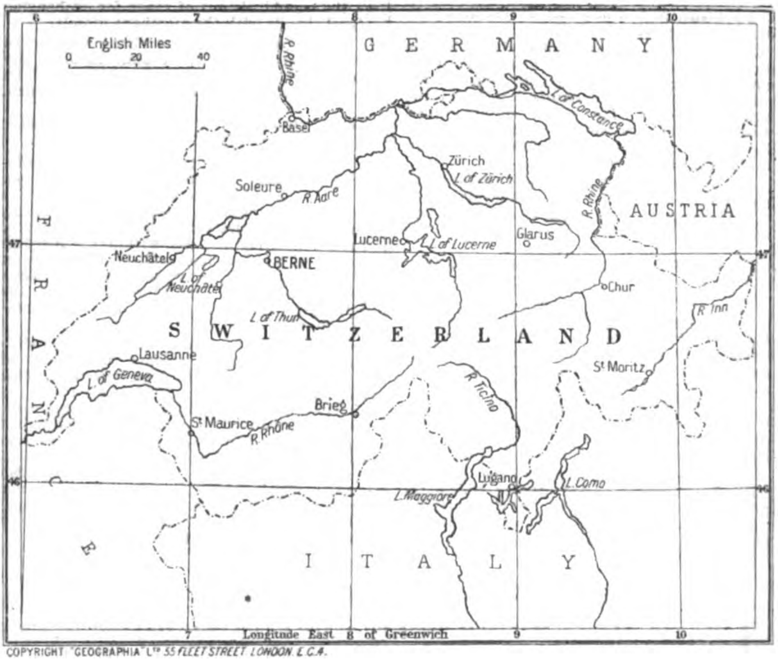
Both Chambers unite to elect the Federal Assembly which wields the supreme authority and higher executive of the Confederation.

CONTROL.

Wireless telegraphy in Switzerland is controlled by the Department of Posts, Telegraphs and Railways, but there is no special branch of the department devoted thereto.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Dr. R. Haab	Head of the Department of Posts, Telegraphs and Railways	Berne
Engineer L. Vanoni ..	Director-General of Swiss Telegraphs and Telephones	Berne
M. Hauser	Assistant to the Director-General	Berne



Wireless telegraphy is a State monopoly, based on the general Federal Law affecting telegraphs and telephones, of December 16th, 1907, of which we print below the apposite clauses.

Licences are, however, granted for receiving stations only, available for a limited period, where these are to be used solely for the reception of time and weather signals. We append the form of such contracts.

ORGANISATION.

At the outbreak of the late war the Federal Council prohibited the erection of new wireless stations, and revoked all existing licences for utilising receiving stations. These private installations were accordingly forthwith dismantled, their apparatus being confiscated and stored by the Telegraph and Telephone Department. Up to the present these stations have not been restored, but re-installation has been authorised for stations belonging to public institutions, for general and technical instruction, and the Military Authorities propose shortly to extend this authorisation to industrial concerns. By way of compensation, the Federal Council decided, for the benefit of the dispossessed licences, to carry out the clause of the International Confederation of October 25th, 1913, relative to an international time association.

Starting with August 1st, 1916, the International Time Signal radiated from the Eiffel Tower is on working days telephonically transmitted by the Telegraph and Telephone Department at Berne to subscribers residing in Switzerland.

ADMINISTRATION.

The texts of the ruling Laws and Regulations reprinted here are :—

A—The Federal Telegraph and Telephone Law of 1907.

B—The Licence for Time and Weather Receiving Station.

C—Federal Decree establishing Telephonic instead of Wireless Reception of International Time Signals.

FEDERAL LAW REGULATING THE ORGANISATION OF TELEGRAPHIC AND TELEPHONIC ADMINISTRATION.

(Dated December 16th, 1907.)

Chapter I.

Art. 1.—The right to establish and exploit any form of electrical telegraph and telephone in Switzerland, or to issue licences for any such apparatus is vested solely in the Confederation.

Art. 2.—Localities whose commercial, industrial, or political status warrants the establishment of telegraphic or telephonic stations shall contribute their just quota towards the expense of such establishment.

Subject to appeal to the Federal Council the Telegraph and Telephone Administration shall decide the matter of installation and extent of the facilities granted. The Federal Council shall specify the rules governing the subvention and guarantees to be given by communities and individuals.

Art. 3.—The right of usage of such facilities shall be common to all. No special privilege with regard to fees or priority of transmission or reception shall be granted to any.

Nevertheless, official communications of the Federal and Canton authorities, as well as messages concerning the Service of Posts, Telegraphs, Telephones, and Railways shall have priority over those of individuals.

Art. 4.—The Supreme Direction of Telegraphic and Telephonic Administration shall belong to the Federal Council.

All regulations affecting this branch of service shall be issued by the Federal Council, so far as the latter shall not have delegated its authority to the Postal, Telegraphic, and Railway Departments or to the responsible officials thereof.

Art. 5.—The Federal Council shall conduct all negotiations concerning general telegraphic and telephonic agreements abroad.

Ratification of such agreements must be made by the Federal Assembly.

The Federal Council may, however, finally ratify agreements concluded with bordering countries on the basis of the general conventions affecting telegraphy and telephony.

Art. 6.—The Federal Council shall appoint all telegraphic and telephonic officials and employees. The nomination of individual employees or fixed classes of employees may however be delegated to the Postal and Railway Department or to the Managing Director of Telegraphs and Telephones.

Art. 7.—The immediate superintendence of all the administration of telegraphs and telephones is delegated to the Postal and Railway Department which is moreover entrusted with the necessary executive power.

Chapter II.

This chapter contains Articles 8, 9, and 10, which enumerate the classes of chief officials.

Chapter III.

This chapter is concerned with the organisation of telegraphic and telephonic zones and the offices and officials to be established in connection therewith. It contains Articles 11 to 16 inclusive.

Chapter IV.

Herein are laid down (in Article 17) the classification and maximum salaries of chief officials.

Chapter V.

In this chapter we find Articles 18 to 22 embodying the general rules applying to the nomination basis of appointment and responsibilities of the various officials.

Chapter VI.

This chapter covers Articles 23 and 24 and concerns itself with offences and penalties. It also includes Article 25 enumerating the previous decrees abolished by this law and Article 26 the formal Direction of Issue.

PROVISIONAL LICENCE FOR TIME AND WEATHER RECEIVING WIRELESS STATIONS.

There is hereby granted to of in the canton of a Provisional Licence to make use of a receiving wireless station which shall be installed in the premises of as well as for the erection of an antenna composed of strands of metres length, between the aforesaid premises and on the following conditions:

1. The erection and upkeep, with all that thereto appertains, shall be carried out in accordance with the regulations laid down by the Federal Council with regard to electric installations, and shall be carried out at the expense of the licensee, who shall have, moreover, to come to an understanding with the corporations or individuals whose property must be hired.

2. The installations granted must not in any way interfere with the working and development of the telegraphic and telephonic systems of the State and/or of the railway companies.

3. The oscillating circuit must be constructed so as to be capable of exact and definite adjustment to a fixed length of wave.

4. The licensee must conform to the rules with regard to wireless telegraphy, which may be laid down, from time to time, by the Federal authorities.

5. The installation granted under this licence must be at all time and in every part accessible to representatives of the administration of telegraphs and telephones entrusted with the duty of control.

6. The installation shall only be used for the reception of time signals. Any other employment thereof (for instance, exchange of messages with radiotelegraphic stations in Switzerland, or outside its frontiers, as well as the communication of any signals that may be received, or of their tenor, to third parties) will be considered as a violation of the rights of the confederation (see the provisions of Articles 23 and 24 of the Federal Law of December 16th, 1907, dealing with the organisation and administration of telegraphs and telephones).

7. When changes of any importance have to be made in the installation, or when its loca-

tion has to be shifted, or if it is to be worked by any other person, the licensee is required to immediately advise the administration of telegraphs and telephones concerning the change.

8. The present licence may be withdrawn at any time and for any period, and this may be done without conferring the right to any indemnity. In such an event the whole installation must be displaced at the cost of the licensee within fifteen days from the period fixed for the expiry of the licence.

9. The licensee shall be responsible for any loss or expense incurred by the Federal administration in consequence of failure to carry out the terms of the present licence.

10. The licensee shall pay to the Administrator of Telegraphs and Telephones a fixed fee of five francs payable at the Central Local Telegraph Centre of to defray the inspection and to cover the cost of registering the licence.

Given at Berne the day of 19 .

I/We, the undersigned, after having acquainted myself/ourselves with the conditions and stipulations hereinabove set forth, declare myself/ourselves willing to accept them and abide by them.

The day of 19 .
(Signed)

TELEPHONIC TIME SIGNAL SERVICE.

Section A.

Decree of the Federal Council dated July 21st, 1916.

The Swiss Federal Council, acting on the suggestion of its Postal and Railway Department, and in view of the Federal decision of March 27th, 1914, decrees:

1. That the international radiotelegraphic time signal radiated daily at 10.56 and at 11 o'clock (H.E.C.) from the Paris Observatory by the Eiffel Tower Station, shall be—during working days—retransmitted telephonically by the Administration of Swiss Telegraphs and Telephones at Berne.

2. Any regular telephone subscriber may take up a subscription to the telephonic time signal, arranging therefor with his telephone exchange.

3. Subscriptions are monthly or annual, and are valid for the civil month or civil year. The rates of subscription are:

(*a*) Fr.2.50 per month, or part of a month.
(*b*) Fr.20 per year.

For eight months at least they must be paid in advance.

4. Over and above the possibility of regular subscriptions, telephone subscribers may arrange to be supplied with odd time-service messages on such circuits as receive them. Each separate message will be charged for at the rate of 20 centimes, and this fee will be included, with ordinary conversation charges, in the monthly account.

5. The Administrator of Telegraphs and Telephones will accept no responsibility with regard to any irregular working of the Telephonic Time-Signal Service; nevertheless every endeavour will be made to assure and develop the service.

6. If any interruption in telephonic transmission of the time-signal last for more than seven consecutive days, without this arising from any fault on the part of the subscriber; the subscription fee will be refunded proportionately to the duration of the interruption.

7. Every effort shall be made to carry this edict into effect on and from the 1st August, 1916.

The Postal and Railway Department shall take steps to carry this out.

Dated Berne, 21st July, 1916.

Section B.

Method of Administration.

1. Every telephone subscriber who desires to subscribe to the Telephonic Time-Signal Service must address a written request to his telephone exchange showing exactly what kind of subscription he desires to take up (see Article 4 of this section, paragraphs (*a*) to (*c*)).

2. The telephone exchange which receives an application for such a subscription may, under this rule, accede to the application immediately.

On the reception of a first request for a subscription, the Telephone Exchange puts itself immediately in touch either with the Central Station through whose intermediary the time signal will be sent, or with its own local centre.

3. The originals of all applications for subscription must be sent to the Chief Office, through the intermediary of the local centres.

4. (*a*) The fees for annual subscriptions must be paid in advance for December, together with the half-yearly fees for the ordinary telephone service.

Fractional fees for subscription, which start on the day of the first reception of the time signal, or from the date of determination of a subscription up to the end of the year, are calculated *pro rata* in the same way as ordinary telephone subscription rates.

An annual subscription may be cancelled at any time by giving eight days' notice. When it is desired to determine a subscription which has not lasted for at least eight months, the monthly subscription rate is applicable thereto.

(*b*) Fees for monthly subscriptions for a settled period (temporary subscriptions) are payable in advance, and for the whole duration of the subscription.

In default of advice to the contrary on the part of the subscriber, his subscription is considered as cancelled on the expiry of the agreed period.

(*c*) Monthly subscriptions of indeterminate duration are renewed automatically month by month. They may be cancelled at the end of a month by notice given at least eight days in advance; the subscription fees being payable monthly and in advance.

(*d*) Requests for reception of odd time-service messages are only granted in the case of lines of some importance, and on condition that they are made at latest by 10.50 a.m. Applicants are rung up at 10.55 a.m.

Applications are noted by entering the number of the subscriber on tickets specially prepared for this purpose. These tickets serve as the basis for the rendering of accounts.

When it has not been possible to attend to an application, because the subscriber's line was engaged his enquiry is charged as a local conversation. Fees for odd time-signal messages are charged for at the end of each month on the same invoice as conversation charges.

5. Subscription rates and charges made for odd time-signal messages come under sub-section 2(*c*) of the accounts for messages,

and must in consequence be entered, duly classified (see Article 4 of section (*a*) above) on Form No. 600 under "Other Receipts."

6. The commission allowed to exchange proprietors attached to central stations of Class III., and of intermediary stations, who have to co-operate in the telephonic time-service amounts to 25 per cent. on receipts. This commission is taken into consideration when the annual telephone accounts are adjusted.

Time-service communications in transit should be recorded in the same way as ordinary conversations in transit.

7. When the time-signal message is transmitted to an intermediary station linked up with a central station of Class III., the latter has only a right to a commission of 2 cents per communication in transit, and the commission of 25 per cent. on the message is allotted to the proprietor of the intermediary station.

TAHITI

(See FRANCE.)

TOGOLAND

It has not yet been possible to obtain from the new administrators particulars of any laws and regulations governing wireless telegraphy in this ex-German territory, but it is hoped to give them in our next issue.

It is learned that this erstwhile German colony has been allocated to Great Britain and France, and these countries' respective colonies of the Gold Coast and Dahomey have absorbed the ex-German territory.

Thus, unlike the sister possessions of South-West Africa and the Tanganyika Territory, Togoland does not retain its entity, but relinquishes it in favour of Britain and France.

Before the war Togoland possessed a powerful wireless station at Kamina, which acted as a relay point between Nauen (Germany) and the station at Windhoek (South-West Africa). Communication was also maintained with Dar-es-Salaam, in German East Africa. Kamina is now in the hands of the French.

TONGA ISLANDS

(See PACIFIC ISLANDS.)

TONQUIN

(See FRANCE.)

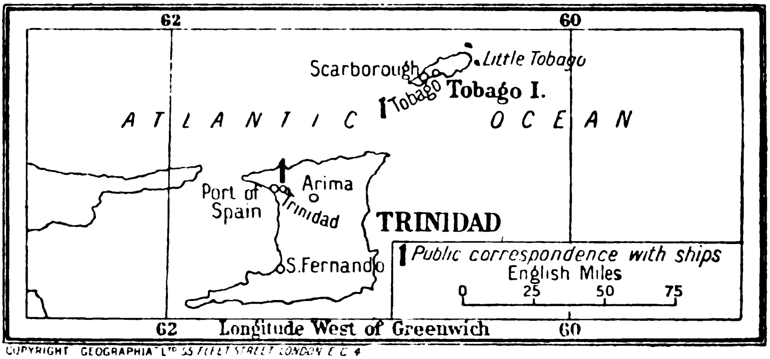
TRINIDAD AND TOBAGO

The Colony of Trinidad and Tobago includes the island of Trinidad, which is about 69 miles long by 52 miles wide, with an area of 1,754 square miles, and the island of Tobago, which is about 26 miles long and 7½ miles wide, with an area of 114 square miles.

Trinidad is situated about 10° north of the Equator, between 61° and 62° west longitude, and Tobago is to the north-east of Trinidad, about 11° 9′ north latitude and 60° 12′ west longitude. They form a Crown Colony, and their government is administered by a Governor, assisted by an Executive Council and Legislative Council.

CONTROL AND ORGANISATION.

The first wireless station in Trinidad was erected in 1905 at the north-western corner of the island to obtain a direct sea line with Tobago, and merely to bring Tobago into telegraphic communication with Trinidad and thus with the outer world. It was a 2-kw. Lodge-Muirhead station. Subsequently this station was removed, and a 5-kw. Marconi station was erected in Port of Spain, with a daylight range of about 350 nautical miles and 1,000 nautical miles at night. Public ship and shore service is maintained therewith.



The Tobago station is on Fort King George, east of Scarborough, the capital of Tobago, and is a 3-kw. station (Marconi and Lodge-Muirhead) with a daylight range of about 350 nautical miles, and about 600 nautical miles at night. Both stations are controlled by the Government under the direct supervision of the Public Works Department.

Officials Controlling Wireless Telegraphy.

Official.	*Title.*	*Address.*
Lieut. M. Cross	O.C. Wireless Station	Trinidad and Tobago
L. W. Pouchet	Principal Assistant	Trin dad and Tobago
A. E. Wilson	Principal Assistant	Trinidad and Tobago

ADMINISTRATION.

The Laws and Regulations governing radiotelegraphy in these colonies which we reprint here in accordance with the following list of which the Ordinance issued May 8th, 1917, is that now in force :—

A—Ordinance No. 6 of 1917.
B—Regulations.

ORDINANCE No. 6 of 1917.

Issued May 8th, 1917.

A Be it enacted by the Governor of Trinidad and Tobago with the advice and consent of the Legislative Council thereof as follows :—

1. This Ordinance may be cited as the Wireless Telegraphy Ordinance, 1917.

2. (1) It shall not be lawful for any person to use or establish in this Colony any apparatus or installation for the purposes of wirelesss telegraphy, without first obtaining from the Governor a licence in that behalf, to be granted on such terms and conditions as the Governor may from time to time prescribe.

(2) Any person contravening the provisions of this section is liable on summary conviction before a Magistrate to a fine not exceeding £50 or to imprisonment, with or without hard labour, for any term not exceeding six months, and the apparatus and installation in respect of which a conviction is obtained may by order of the convicting magistrate be forfeited to the use of His Majesty the King.

3. (1) No person shall work any apparatus for wireless telegraphy installed on any merchant ship whilst that ship is in the territorial waters of the Colony, otherwise than in accordance with regulations made in that behalf by the Governor in Executive Council.

(2) Such regulations shall be published in the *Royal Gazette*.

(3) Any person contravening, or permitting, procuring, or assisting in the contravention of, any such regulation is liable, on summary conviction before a magistrate, to a penalty not exceeding £50, or to imprisonment, with or without hard labour, for any term not exceeding six months.

4. Any person who unlawfully and maliciously :—

(*a*) Injures, removes or destroys any apparatus or installation for the purpose of wireless telegraphy, or any part of such apparatus or installation ; or

(*b*) Obstructs or prevents in any manner whatsoever the sending, conveyance or delivery of any message or signal by wireless telegraphy ;

is guilty of a misdemeanour and is liable to imprisonment, with or without hard labour, for any term not exceeding two years.

5. The Wireless Telegraph Ordinance (No. 236) and the Wireless Telegraphy Ordinance 1909 are hereby repealed.

Passed in Council this twenty-seventh day of April, in the year of Our Lord one thousand nine hundred and seventeen.

REGULATIONS MADE UNDER THE WIRELESS TELEGRAPHY ORDINANCE, 1917.

BARBADOS.

1. All apparatus for wireless telegraphy on board a merchant ship in the territorial waters of the Colony shall be worked in such a way as not to interfere with (*a*) Naval signalling or (*b*) the working of any wireless telegraph station lawfully established, installed or worked in the Colony or the territorial waters thereof, and in particular the said apparatus shall be worked so as not to interrupt or interfere with the transmission of any messages between wireless telegraph stations established as aforesaid on land and wireless telegraph stations established on ships at sea.

2. No apparatus for wireless telegraphy on board a merchant ship shall be worked or used whilst such ship is in any of the harbours of the Colony, except with the special or general permission in writing of the Director of Public Works of the Colony. Such special or general permission shall only be given to any ship subject to the condition that it shall not exchange signals with another ship except on the private business of the owners.

3. If at any time in the opinion of the Governor an emergency has arisen in which it is expedient for the public service that His Majesty's Government shall have control over the transmission of messages by wireless telegraphy, the use of wireless telegraphy on board merchant ships whilst in the territorial waters of the Colony shall be subject to such further rules as may be made by the Governor in Executive Council.

4. These regulations shall not apply to the use of wireless telegraphy for the purpose of making or answering the signals of distress.

5. The regulations made under the Wireless Telegraphy Ordinance, 1917, on the 5th day of July, 1917, are hereby revoked.

Made by the Acting Governor in Executive Council this 12th day of June, 1919.

TRIPOLI

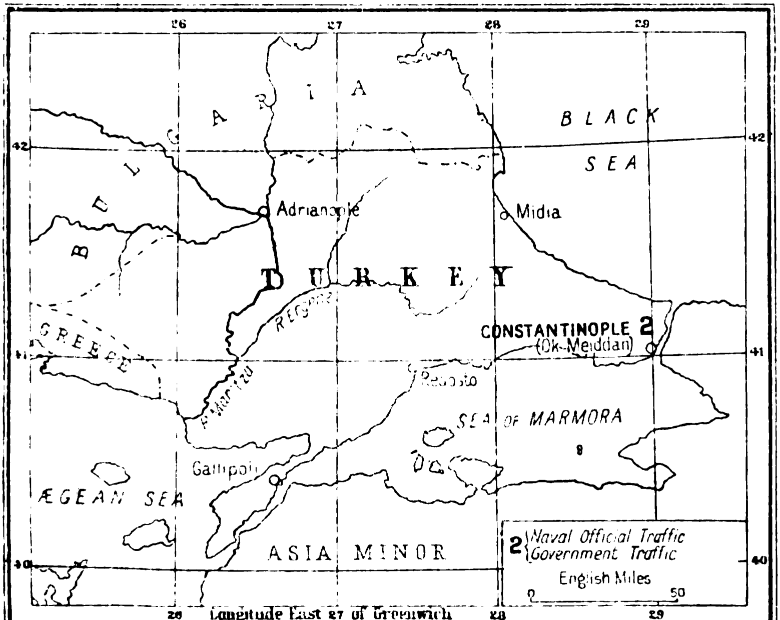
(See ITALY.)

TUNIS

(See FRANCE.)

TURKEY

STABLE conditions in the Ottoman Empire are not yet re-established sufficiently to enable us to obtain any information in regard to radiotelegraphy and telephony in that country, but we hope, in our next volume,



to print the full text of any laws and regulations which have been published in the interim. As far as is known there is one station for Government traffic only.

CONTROL.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. Réfik Halid ..	Director-General of Posts, Telegraphs and Telephones	Constantinople

UGANDA

THIS Protectorate and that of "East Africa" constitute the whole area (leaving out of account the ex-German territory) on the East Coast of Africa subject to British rule.

Uganda came under British dominion in 1890, and a portion of the territories was for a time administered by the Imperial British East African Company. The northern boundary is limited by the Sudan, the eastern by Lake Rudolf, the western by the Belgian Congo, and the southern by the ex-German Colony.

The administrative centre is Entebbe, the native capital of Uganda being Mengo, Kampala. Nile steamers from Khartoum ply to Rejaf. The Uganda Railway runs from Kisumu on Lake Victoria Nyanza to Mombasa on the coast of East Africa.

CONTROL.

OFFICIAL CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. W. G. Tucker	Telegraph Engineer in charge ..	Entebbe

ADMINISTRATION.

Wireless telegraphy is administered under the following:—

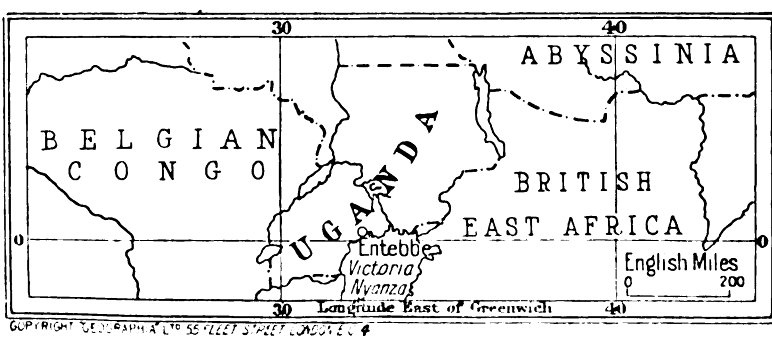
ORDINANCE.

1. This Ordinance may be cited as "The Wireless Telegraphs Ordinance, 1908."

2. No person shall use or establish any apparatus or installation for the purpose of operating wireless telegraphs without a licence from the Governor.

Any person contravening the terms of this section shall be liable on conviction to a fine not exceeding Rs. 1,500 or imprisonment of either kind for a term not exceeding twelve months, and any apparatus or installation in respect of which an offence under this section is committed may be forfeited and sold or disposed of as the Governor may direct.

3. It shall be lawful for the Governor from time to time by rules to prescribe the terms and conditions upon which licences to use or establish apparatus or installations for the purpose of operating wireless telegraphs may be granted.



UNION OF SOUTH AFRICA

(See SOUTH AFRICA, UNION OF.)

UNITED STATES OF AMERICA

THE declaration of independence of the States of the American Union was adopted by Congress July 4th, 1776. The Constitution of September 17th, 1787, lays down the basis of government under which (modified by amendments in 1787, 1791, 1798, 1804, 1865, 1868, 1870, and 1913) this great and powerful Republic is now governed.

The Union comprises 48 STATES, each of which is provided with a Legislature of two Houses, a Governor at the head of the Executive and a judicial system. The District of Columbia (D.C.) is the seat of the Federal Government, and was provided by the State of Maryland for this purpose in 1791. It is co-extensive with the City of Washington, and embraces an area of 60 miles. The TERRITORIES of Alaska and Hawaii are governed by local Legislatures, whose Acts may be modified or annulled by Congress. The grand total of the superfices governed under the U.S.A. Constitution amounts to 3,574,658 square miles.

N.B.—There are, moreover, DEPENDENCIES administered by the U.S.A. Government. Their rule is undertaken by a Governor and staff appointed by the President. Porto Rico and the Philippines belong to this division, although provided with Representative Government. Guam, in the Mariana Archipelago (Pacific Ocean), and the Samoan Islands are pure Dependencies administered by the U.S. Navy Department. Wireless in all these instances is controlled by the Navy Department in war time, but in peace time the radio stations of Porto Rico, Hawaii, and Alaska are under the jurisdiction of the Department of Commerce, and all commercial transmitting radio stations operated in these dependencies must be licensed by this Department, and the operators of such stations must also be licensed.

The " CANAL ZONE " on the Isthmus of Panama ranks as a Dependency, but it has been judged best to print the wireless particulars relating thereto separately under the heading " Panama—Canal Zone."

CONTROL.

The Congress of the United States has delegated to the Department of Commerce the duty of the enforcement of the Wireless Communication Laws and the International Radio-telegraph Convention, and the work is handled through the Bureau of Navigation, Washington.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

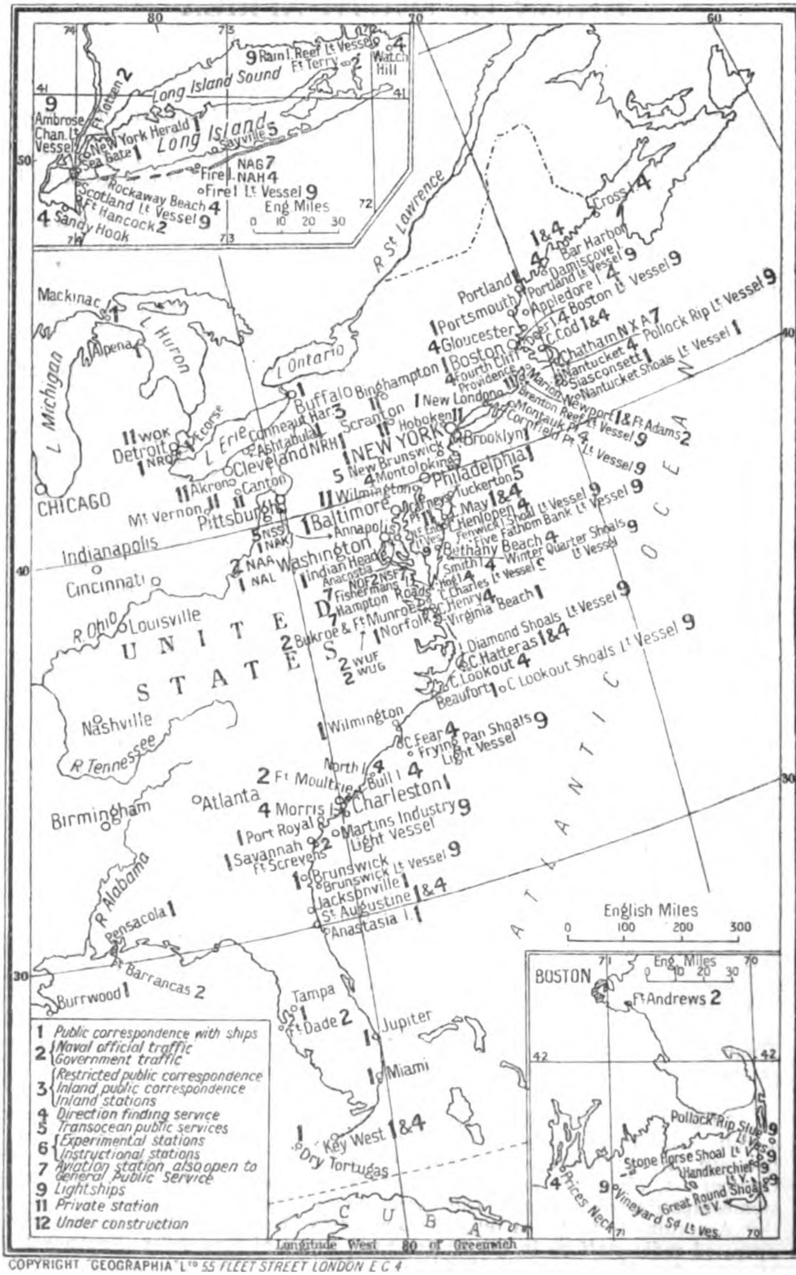
Officials.	*Title.*	*Address.*
Rear-Admiral W. H. G. Bullard	Director of Naval Communications ..	Washington
Joshua W. Alexander	Secretary of Commerce	Washington
E. F. Sweet	Assistant Secretary of Commerce	Washington
E. T. Chamberlain	Commissioner of Navigation	Washington
A. J. Tyrer	Deputy Commissioner of Navigation ..	Washington
W. D. Terrell	Radio Inspector in Charge	Washington

There are, in addition, fifteen inspectors and assistant inspectors, stationed at various districts established by the Bureau of Navigation.

ORGANISATION.

In September and October, 1899, Senatore (then Mr.) Marconi installed a radio station for the purpose of reporting the International yacht races between the yachts *Shamrock* and *Columbia*. The *New York Herald* of October 1st, 1899, tells how wireless was used for sending bulletins from the steamships *Ponce* and *Grande Duchesse*, which followed the contending yachts.

According to the most reliable information obtainable, the first regularly operated radio stations in the United States were at Siasconset (Nantucket), Mass., and on Nantucket Shoals Lightship No. 66, work on which was started


1 Public correspondence with ships
2 Naval official traffic
Government traffic
3 Restricted public correspondence
Inland public correspondence
Inland stations
4 Direction finding service
5 Transocean public services
6 Experimental stations
Instructional stations
7 Aviation station also open to general Public Service
9 Lightships
11 Private station
12 Under construction
English Miles
0 100 200 300
UNITED STATES
ATLANTIC OCEAN
CUBA
Longitude West 80 of Greenwich
Long Island Sound
Long Island
Ambrose Chan. Lt Vessel
New York Herald
Sea Gate
Sayville
Fire I.
NAG 7
NAH 4
Fire I. Lt Vessel 9
Rockaway Beach 4
Scotland Lt Vessel 9
Ft Hancock 2
Sandy Hook
Watch Hill
Eng Miles
R St Lawrence
L Ontario
L Huron
L Michigan
L Erie
Mackinac
Alpena
CHICAGO
Detroit
Buffalo
Binghampton
Scranton
Cleveland
Ashtabula
Conneaut Har
Akron
Canton
Pittsburgh
Mt Vernon
Indianapolis
Cincinnati
Louisville
R Ohio
Nashville
R Tennessee
Birmingham
Atlanta
R Alabama
Pensacola
Ft Barrancas 2
Burrwood
Tampa
Ft Dade 2
Jupiter
Miami
Key West 1&4
Dry Tortugas
Anastasia I.
St Augustine 1&4
Jacksonville
Brunswick
Brunswick Lt Vessel 9
Savannah
Ft Screven
Port Royal
Martins Industry Light Vessel 9
Charleston
Morris I.
Ft Moultrie
Bull I 4
North I. 4
C Fear 4
Frying Pan Shoals Light Vessel 9
Wilmington
Beaufort
C Lookout 4
C Lookout Shoals Lt Vessel 9
C Hatteras 1&4
Diamond Shoals Lt Vessel 9
Norfolk
Virginia Beach
C Henry 4
Bukroe & Ft Munroe
Hampton Roads
Fishermans I.
C Charles Lt Vessel
Winter Quarter Shoals Lt Vessel 9
Bethany Beach 4
Five Fathom Bank Lt Vessel 9
Fenwick Shoal Lt Vessel 9
C Henlopen 4
C May 1&4
Tuckerton 5
Philadelphia
Baltimore
Annapolis
Washington
Indian Head
Anacostia
NAA
NAL
NSS
NAK
WUF
WUG
Wilmington
New Brunswick
NEW YORK
Brooklyn
Hoboken
New London
Providence
Montauk Pt
Brenton Reef Lt Vessel 9
Newport 1 & Ft Adams 2
Marion
Nantucket 4
Siasconsett 1
Nantucket Shoals Lt Vessel 1
Pollock Rip Lt Vessel 9
Chatham NXA 7
C Cod 1&4
Boston Lt Vessel 9
Boston
Gloucester
Portsmouth
Portland
Portland Lt Vessel 9
Appledore I. 4
Damiscove I.
Bar Harbor
Cross I. 4
BOSTON
Eng Miles
Ft Andrews 2
Pollock Rip Slue 9
Stone Horse Shoal Lt V. 9
Handkerchief Lt V. 9
Great Round Shoal Lt V. 9
Vineyard Sd Lt Ves.
Prices Neck

early in the summer of 1901. These stations were not experimental, or demonstrational, or temporary stations, but were erected for the particular purpose of providing for the regular daily transmission of ship news, and for regular communication and exchange of messages with vessels equipped with similar apparatus. They were owned and operated by the *New York Herald*, and were equipped with Marconi apparatus purchased from, and installed by, the English Marconi Company.

The *New York Herald* of August 17th, 1901, contained an account of how the first radiotelegraphic station at Siasconset got into communication by wireless with the Nantucket Shoals Lightship. The latter on August 16th received from the s.s. *Lucania*, of the Cunard Line, at a distance of 72 miles, the first connected wireless message ever radiated to the United States from an approaching vessel. That message ran, " All well on board."

In 1899 (the same year as that of the first wirelessly reported yacht races) the matter of establishing radio services in the TERRITORY of HAWAII was receiving official attention. It was not until March 1st, 1901, however, that radio stations on the island were opened for business, the apparatus being supplied with power by Marconi induction coils. On October 15th, 1908, a 10-kw. station was erected at Kahuku Point, in Oahu (Hawaii), and at that time this was probably the most powerful station on the Pacific. Uninterrupted night communication was established with the wireless station on Telegraph Hill, San Francisco, California, a distance of 2,100 miles. This constituted the first direct radio communication between Hawaii and the U.S.A. On April 1st, 1915, a wireless service was established between the station at Wahiawa, Oahu (Hawaii), and the United States Naval Station at Tuluila, Samoa (2,400 miles distant). A composite system of equipment was used, with a transformer input of 6 kw., and a reliable nightly service has been maintained ever since.

In the TERRITORY of ALASKA radio communication takes the place of wired telegraph and telephone services. The large fish-canning companies rely almost exclusively upon their radio installations for communication between their canning plants, and for the maintenance of touch with their vessels engaged in this industry. There are 44 private stations. Static interference or atmospherics is practically unknown there.

The following statistics illustrate the present extensive use of radiotelegraphy in the U.S.A.

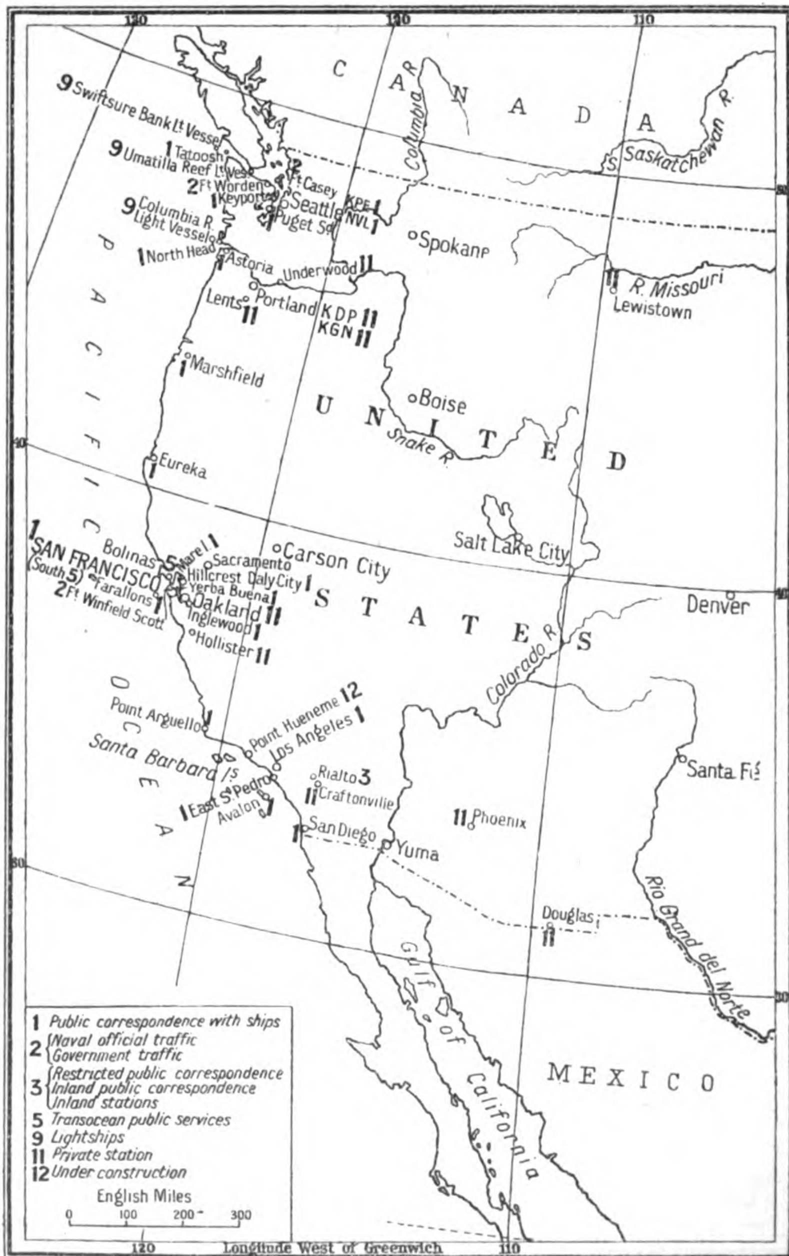
Stations for public service to ships	92
Stations for Government traffic only	37
Stations for restricted public traffic	2
Stations for direction-finding service	30
Transocean stations	7
Experimental stations	4
Stations for light vessels	44
Private stations	26
Stations under construction	1
Stations for aviation only	5

In practically every city of any size in the United States there are one or more radio clubs, composed of men interested in radiotelegraphy from a scientific standpoint, practical radio men, and amateur radio experimenters.† The most important of these clubs is the Institute of Radio Engineers (particulars regarding which may be obtained from the Year Book published in New York by the Institute).

ADMINISTRATION.

In 1910 an effort to regulate radio communication in the United States was made, when a Bill was prepared and passed by the Senate. It was not reached on the House of Representatives calendar, and therefore did not become effective.

† For a list of the Principal Clubs and Societies see special section of this volume, " Directory of Wireless Societies."


CANADA
UNITED STATES
MEXICO
PACIFIC OCEAN
9 Swiftsure Bank Lt Vessel
1 Tatoosh
9 Umatilla Reef Lt Vessel
2 Ft Worden
2 Ft Casey
1 Keyport
Seattle
KPE 1
NVL 1
Puget Sd
9 Columbia R. Light Vessel
1 North Head
Astoria
Underwood 11
Spokane
Columbia R.
Saskatchewan R.
R. Missouri
11 Lewistown
Lents 11
Portland
KDP 11
KGN 11
1 Marshfield
Boise
Snake R.
Eureka 1
Salt Lake City
Bolinas 5
Marshall 1
1 SAN FRANCISCO (South 5)
Farallons 1
2 Ft Winfield Scott
Sacramento
Carson City
Hillcrest
Daly City 1
Yerba Buena 1
Oakland 11
Inglewood 1
Hollister 11
Denver
Colorado R.
Point Arguello 1
Point Hueneme 12
Los Angeles 1
Santa Barbara Is
Rialto 3
11 Craftonville
1 East S. Pedro
Avalon 1
1 San Diego
Yuma
11 Phoenix
Santa Fé
Douglas 11
Rio Grand del Norte
Gulf of California
1 Public correspondence with ships
2 Naval official traffic / Government traffic
3 Restricted public correspondence / Inland public correspondence / Inland stations
5 Transocean public services
9 Lightships
11 Private station
12 Under construction
English Miles
0 100 200 300
120
110
Longitude West of Greenwich

The first Act requiring radioapparatus on certain passenger-carrying vessels was approved June 24th, 1910. Under this Act the Secretary of Commerce and Labour organised on July 1st, 1911, the radio service, composed of three inspectors, with headquarters at New York, N.Y., Baltimore, Md., and San Francisco, Cal.

The second Act, approved July 23rd, 1912, amended the above Act so as to cover all vessels navigating the ocean or the great lakes and licensed to carry or carrying 50 or more persons, including passengers or crew or both, with the exception of steamers plying between ports or places less than 200 miles apart. This Act also requires an auxiliary source of power independent of the vessel's main electric power plant, which will enable the sending set for at least four hours to send messages over a distance of at least 100 miles; efficient communication between the operator in the radio room and the bridge; and that the radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated, with the exception of cargo vessels, on which, in lieu of the second operator, a member of the crew competent to receive and understand distress calls and other calls indicating danger may be substituted to aid in maintaining a constant wireless watch, so far as required for the safety of lives.

The Act to regulate radio communication was approved August 13th, 1912. Under this Act transmitting stations and radio operators are licensed by the Secretary of Commerce. Transmitting stations are inspected to determine if they comply with the requirements of the law. Radio operators are examined in order to determine their qualifications.

In addition to the above-mentioned Acts, the Department also enforces the London International Radiotelegraphic Convention rules of 1912, to which the United States is a party.

On March 4th, 1913, the Act abolishing the Department of Commerce and Labour and creating the Department of Commerce and the Department of Labour became effective. The enforcement of the radio laws was placed under the jurisdiction of the Secretary of Commerce.

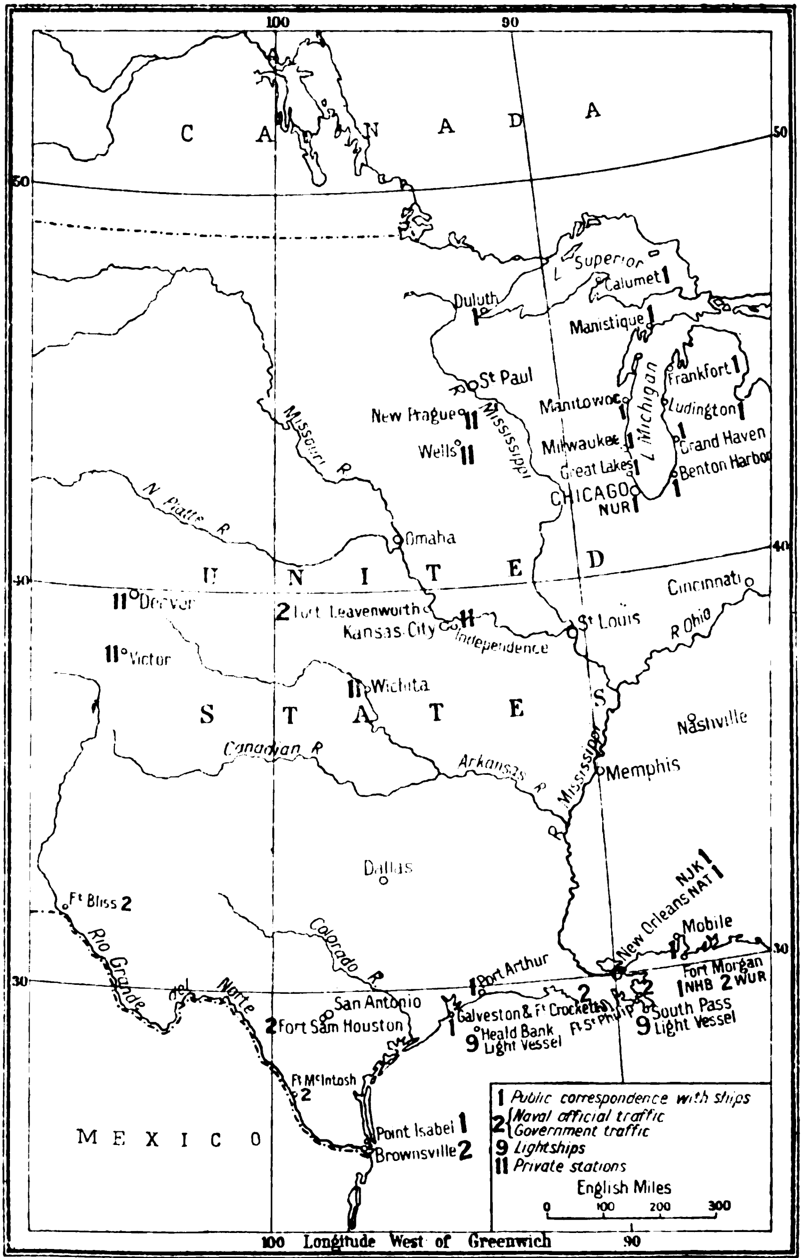
The items published in the following pages are :—

A—Act of August 13th, 1912, to regulate Radio Communication.
B—Regulations, 1912.
C—Regulations governing Ship and Land Radio Stations.
D—Regulations governing Radio Operators.
E—General Information.
F—Certificate of Radio Inspection.
G—Master's Certificate of Radio Apparatus.
H—Licence for General Public Service Coast Radio Station.
I—Licence for Ship Radio Station.
J—Licence for Land Radio Station.
K—Licence for Amateur Radio Station.
L—Licence to Radio Operator, Commercial Extra First Grade.
M—Licence to Radio Operator, Commercial Grade.
N—Licence to Radio Operator, Amateur First Grade.
O—Licence to Radio Operator, Amateur Second Grade.
P—Notice to Berne Bureau.
Q—Act concerning International Communication.

A AN ACT TO REGULATE RADIO COMMUNICATION.

APPROVED AUGUST 13TH, 1912.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That a person, company, or corporation within the jurisdiction of the United States shall not use or operate any apparatus for radio communication as a means of commercial intercourse among the several States, or with foreign nations, or upon any vessel of the United States engaged in interstate or foreign commerce, or for the transmission of radiograms or signals the effect of which extends beyond the jurisdiction of the State or Territory in which the same are made, or where interference would be caused thereby with the receipt of messages or signals from beyond the jurisdiction of the said State or Territory, except under and in accordance with a licence,


CANADA
UNITED STATES
MEXICO
L. Superior
Calumet 1
Duluth 1
Manistique 1
L. Michigan
Frankfort 1
Ludington 1
Manitowoc 1
Milwaukee 1
Grand Haven 1
Great Lakes 1
Benton Harbor 1
CHICAGO NUR 1
St Paul
New Prague 11
Wells 11
Mississippi
Missouri R.
N. Platte R.
Omaha
11 Denver
2 Fort Leavenworth
Kansas City
11 Independence
St Louis
Cincinnati
R. Ohio
11 Victor
11 Wichita
Canadian R.
Arkansas R.
Nashville
Memphis
Dallas
Ft Bliss 2
Rio Grande del Norte
Colorado R.
San Antonio
2 Fort Sam Houston
1 Port Arthur
1 Galveston & Ft Crockett 2
9 Heald Bank Light Vessel
Ft St Philip
9 South Pass Light Vessel
New Orleans NAT 1 NJK 1
Mobile 1
Fort Morgan 1 NHB 2 WUR
Ft McIntosh 2
Point Isabel 1
Brownsville 2
1 Public correspondence with ships
2 Naval official traffic Government traffic
9 Lightships
11 Private stations
English Miles
0 100 200 300
100 Longitude West of Greenwich 90

revocable for cause, in that behalf granted by the Secretary of Commerce upon application therefor; but nothing in this Act shall be construed to apply to the transmission and exchange of radiograms or signals between points situated in the same State: Provided, That the effect thereof shall not extend beyond the jurisdiction of the said State or interfere with the reception of radiograms or signals from beyond said jurisdiction; and a licence shall not be required for the transmission or exchange of radiograms or signals by or on behalf of the Government of the United States, but every Government station on land or sea shall have special call letters designated and published in the list of radio stations of the United States by the Department of Commerce. Any person, company, or corporation that shall use or operate any apparatus for radio communication in violation of this section, or knowingly aid or abet another person, company, or corporation in so doing, shall be deemed guilty of a misdemeanour, and on conviction thereof shall be punished by a fine not exceeding five hundred dollars, and the apparatus or device so unlawfully used and operated may be adjudged forfeited to the United States.

Sec. 2.—That every such licence shall be in such form as the Secretary of Commerce shall determine and shall contain the restrictions, pursuant to this Act, on and subject to which the licence is granted; that every such licence shall be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico, and shall specify the ownership and location of the station in which said apparatus shall be used and other particulars for its identification and to enable its range to be estimated; shall state the purpose of the station, and, in case of a station in actual operation at the date of passage of this Act, shall contain the statement that satisfactory proof has been furnished that it was actually operating on the above-mentioned date; shall state the wave-length or the wave-lengths authorised for use by the station for the prevention of interference and the hours for which the station is licensed for work; and shall not be construed to authorise the use of any apparatus for radio communication in any other station than that specified. Every such licence shall be subject to the regulations contained herein, and such regulations as may be established from time to time by authority of this Act or subsequent Acts and treaties of the United States. Every such licence shall provide that the President of the United States in time of war or public peril or disaster may cause the closing of any station for radio communication and the removal therefrom of all radio apparatus, or may authorise the use or control of any such station or apparatus by any department of the Government, upon just compensation to the owners.

Sec. 3.—That every such apparatus shall at all times while in use and operation as aforesaid be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce. Every person so licensed who in the operation of any radio apparatus shall fail to observe and obey regulations contained in or made pursuant to this Act or subsequent Acts or treaties of the United States, or any one of them, or who shall fail to enforce obedience thereto by an unlicensed person while serving under his supervision, in addition to the punishments and penalties herein prescribed, may suffer the suspension of the said licence for a period to be fixed by the Secretary of Commerce not exceeding one year. It shall be unlawful to employ any unlicensed person or for any unlicensed person to serve in charge or in supervision of the use and operation of such apparatus, and any person violating this provision shall be guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than one hundred dollars or imprisonment for not more than two months, or both, in the discretion of the court for each and every such offence: *Provided*, That in case of emergency the Secretary of Commerce may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the radio ship Act of June 24th, 1910.

Sec. 4.—That for the purpose of preventing or minimising interference with communication between stations in which such apparatus is operated, to facilitate radio communication, and to further the prompt receipt of distress signals, said private and commercial stations shall be subject to the regulations of this section. These regulations shall be enforced by the Secretary of Commerce through the collectors of customs and other officers of the Government as other regulations herein provided for.

The Secretary of Commerce may, in his discretion, waive the provisions of any or all of these regulations when no interference of the character above mentioned can ensue.

The Secretary of Commerce may grant special temporary licences to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave-lengths, at such hours, and under such conditions as will ensure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations.

In these regulations the naval and military stations shall be understood to be stations on land.

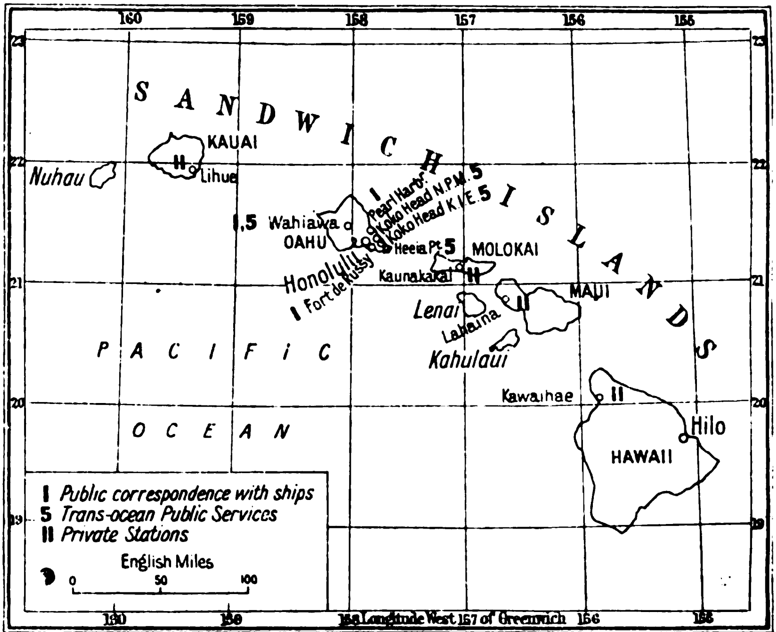
REGULATIONS.

Normal Wave-Length.

1. Every station shall be required to designate a certain definite wave-length as the normal sending and receiving wave-length of the station. This wave-length shall not exceed 600 metres or it shall exceed 1,600 metres. Every coastal station open to general public service shall at all times be ready to receive messages of such wave-lengths as are required by the Berlin Convention. Every ship station, except as hereinafter provided, and every coast station open to general public service, shall be prepared to use two sending wave-lengths, one of 300 metres and one of 600 metres, as required by the International Convention in force: *Provided*, That the Secretary of Commerce may, in his discretion, change the limit of wave-length reservation made by regulations first and second to accord with any international agreement to which the United States is a party.

Other Wave-Lengths.

2. In addition to the normal sending wave-length all stations, except as provided herein-



after in these regulations, may use other sending wave-lengths: *Provided*, That they do not exceed 600 metres or that they do exceed 1,600 metres: *Provided further*, That the character of the waves emitted conforms to the requirements of regulations 3 and 4 following.

Use of a "Pure Wave."

3. At all stations if the sending apparatus, to be referred to hereinafter as the "transmitter," is of such a character that the energy is radiated in two or more wave-lengths, more or less sharply defined, as indicated by a sensitive wave-metre, the energy in no one of the lesser waves shall exceed 10 per cent. of that in the greatest.

Use of a "Sharp Wave."

4. At all stations the logarithmic decrement per complete oscillation in the wave trains emitted by the transmitter shall not exceed two-tenths, except when sending distress signals or signals and messages relating thereto.

Use of "Standard Distress Wave."

5. Every station on shipboard shall be prepared to send distress calls on the normal wave-length designated by the international convention in force, except on vessels of small tonnage unable to have plants insuring that wave-length.

Signal of Distress.

6. The distress call used shall be the international signal of distress • • • ▬ ▬ ▬ • • •

Use of "Broad Interfering Wave" for Distress Signals.

7. When sending distress signals, the transmitter of a station on shipboard may be tuned in such a manner as to create a maximum of interference with a maximum of radiation.

Distance Requirement for Distress Signals.

8. Every station on shipboard, wherever practicable, shall be prepared to send distress signals of the character specified in regulations 5 and 6 with sufficient power to enable them to be received by day over sea a distance of 100 nautical miles by a shipboard station equipped with apparatus for both sending and receiving equal in all essential particulars to that of the station first mentioned.

"Right of Way" for Distress Signals.

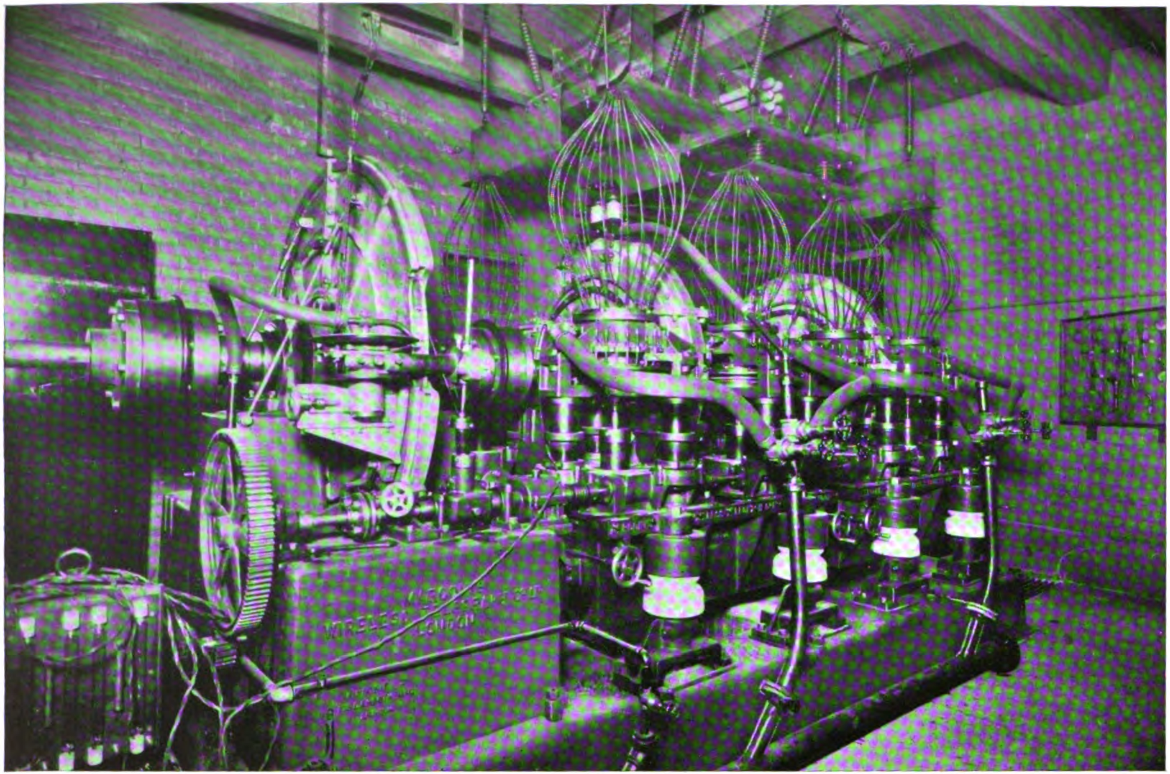
9. All stations are required to give absolute priority to signals and radiograms relating to ships in distress; to cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, to refrain from sending until all signals and radiograms relating thereto are completed.

Reduced Power for Ships near a Government Station.

10. No station on shipboard when within fifteen nautical miles of a naval or military station shall use a transformer input exceeding 1 kw., nor, when within five nautical miles of such a station, a transformer input exceeding ½ kw., except for sending signals of distress, or signals or radiograms relating thereto.

Intercommunication.

11. Each shore station open to general public service between the coast and vessels at sea shall be bound to exchange radiograms with any similar shore station and with any ship station without distinction of the radio



MARION (U.S.A.). VIEW OF THE MARCONI C.W. TIMED SPARK DISCHARGER, SHOWING AIR BLAST PIPING AND CONDENSER LEADS.

[*To face page* 416

systems adopted by such stations, respectively, and each station on shipboard shall be bound to exchange radiograms with any other station on shipboard without distinction of the radio systems adopted by each station, respectively.

It shall be the duty of each such shore station, during the hours it is in operation, to listen-in at intervals of not less than fifteen minutes, and for a period not less than two minutes, with the receiver tuned to receive messages of 300 metre wave-lengths.

Division of Time.

12. At important seaports and at all other places where naval or military and private or commercial shore stations operate in such close proximity that interference with the work of naval and military stations cannot be avoided by the enforcement of the regulations contained in the foregoing regulations concerning wave-lengths and character of signals emitted, such private or commercial shore stations as do interfere with the reception of signals by the naval and military stations concerned shall not use their transmitters during the first fifteen minutes of each hour, local standard time. The Secretary of Commerce may, on the recommendation of the department concerned, designate the station or stations which may be required to observe this division of time.

Government Stations to Observe Division of Time.

13. The naval or military stations for which the above-mentioned division of time may be established shall transmit signals or radiograms only during the first fifteen minutes of each hour, local standard time, except in case of signals or radiograms relating to vessels in distress, as hereinbefore provided.

Use of Unnecessary Power.

14. In all circumstances, except in case of signals or radiograms relating to vessels in distress, all stations shall use the minimum amount of energy necessary to carry out any communication desired.

General Restrictions on Private Stations.

15. No private or commercial station not engaged in the transaction of bona fide commercial business by radio communication or in experimentation in connection with the development and manufacture of radio apparatus for commercial purposes shall use a transmitting wave-length exceeding 200 metres or a transformer input exceeding 1 kw., except by special authority of the Secretary of Commerce contained in the licence of the station: *Provided*, That the owner or operator of a station of the character mentioned in this regulation shall not be liable for a violation of the requirements of the third or fourth regulations to the penalties of one hundred dollars or twenty-five dollars, respectively, provided in this section unless the person maintaining or operating such station shall have been notified in writing that the said transmitter has been found, upon tests conducted by the Government, to be so adjusted as to violate the said third and fourth regulations, and opportunity has been given to said owner or operator to adjust said transmitter in conformity with said regulations.

Special Restrictions in the Vicinities of Government Stations.

16. No station of the character mentioned in regulation 15 situated within five nautical



miles of a naval or military station shall use a transmitting wave-length exceed 200 metres or a transformer input exceeding ½ kw.

Ship Stations to Communicate with Nearest Shore Stations.

17. In general, the shipboard stations shall transmit their radiograms to the nearest shore station. A sender on board a vessel shall, however, have the right to designate the shore station through which he desires to have his radiograms transmitted. If this cannot be done, the wishes of the sender are to be complied with only if the transmission can be effected without interfering with the service of other stations.

Limitations for Future Installations in Vicinities of Government Stations.

18. No station on shore not in actual operation at th date of the passage of this Act shall be licensed for the transaction of commercial business by radio communication within fifteen nautical miles of the following naval or military stations, to wit: Arlington, Virginia; Key West, Florida; San Juan, Porto Rico; North Head and Tatoosh Island, Washington; San Diego, California; and those established or which may be established in Alaska and in the Canal Zone; and the head of the department having control of such Government stations shall, so far as is consistent with the transaction of governmental business, arrange for the transmission and receipt of commercial radiograms under the provisions of the Berlin Convention of 1906, and future International Conventions or treaties to which the United States may be a party, at each of the stations above referred to, and shall fix the rates therefor, subject to control of such rates by Congress. At such stations and wherever and whenever shore stations open for general public business between the coast and vessels at sea under the provisions of the Berlin Convention of 1906 and future International Conventions and treaties to which the United States may be a party shall not be so established as to insure a constant service day and night without interruption, and in all localities wherever or whenever such service shall not be maintained by a commercial shore station within 100 nautical miles of a naval radio station, the Secretary of the Navy shall, so far as is consistent with the transaction of governmental business, open naval radio stations to the general public business described above, and shall fix rates for such service, subject to control of such rates by Congress. The receipts from such radiograms shall be covered into the Treasury as miscellaneous receipts.

Secrecy of Messages.

19. No person or persons engaged in or having knowledge of the operation of any station or stations, shall divulge or publish the contents of any messages transmitted or received by such station, except to the person or persons to whom the same may be directed or their authorised agent, or to another station employed to forward such message to its destination, unless legally required so to do by the court of competent jurisdiction or other competent authority. Any person guilty of divulging or publishing any message, except as herein provided, shall, on conviction thereof, be punished by a fine of not more than two hundred and fifty dollars or imprisonment for a period of not exceeding three months, or both fine and imprisonment, in the discretion of the court.

Penalties.

For violation of any of these regulations, subject to which a licence under sections 1 and 2 of this Act may be issued, the owner of the apparatus shall be liable to a penalty of one hundred dollars, which may be reduced or remitted by the Secretary of Commerce and for repeated violations of any of such regulations the licence may be revoked.

For violation of any of these regulations, except as provided in regulation 19, subject to which a licence under section 3 of this Act may be issued, the operator shall be subject to a penalty of twenty-five dollars, which may be reduced or remitted by the Secretary of Commerce, and for repeated violations of any such regulations, the licence shall be suspended or revoked.

Sec. 5.—That every licence granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not wilfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanor, and upon conviction thereof the owner or operator, or both, shall be punishable by a fine of not to exceed five hundred dollars or imprisonment for not to exceed one year, or both.

Sec. 6.—That the expression "radio communication" as used in this Act means any system of electrical communication by telegraphy or telephony without the aid of any wire connecting the points from and at which the radiograms, signals, or other communications are sent or received.

Sec. 7.—That a person, company, or corporation within the jurisdiction of the United States shall not knowingly utter or transmit, or cause to be uttered or transmitted, any false or fraudulent distress signal or call or false or fraudulent signal, call, or other radiogram of any kind. The penalty for so uttering or transmitting a false or fraudulent distress signal or call shall be a fine of not more than two thousand five hundred dollars or imprisonment for not more than five years, or both, in the discretion of the court, for each and every such offence, and the penalty for so uttering or transmitting, or causing to be uttered or transmitted, any other false or fraudulent signal, call, or other radiogram shall be a fine or not more than one thousand dollars or imprisonment for not more than two years, or both, in the discretion of the court, for each and every such offence.

Sec. 8.—That a person, company, or corporation shall not use or operate any apparatus for radio communication on a foreign ship in territorial waters of the United States otherwise than in accordance with the provisions of sections 4 and 7 of this Act, and so much of section 5 as imposes a penalty for interference. Save as aforesaid, nothing in this Act shall apply to apparatus for radio communication on any foreign ship.

Sec. 9.—That the trial of any offence under this Act shall be in the district in which it is committed, or if the offence is committed upon the high seas or out of the jurisdiction of any particular State or district the trial shall be in the district where the offender may be found or into which he shall be first brought.

Sec. 10.—That this Act shall not apply to the Philippine Islands.

Sec. 11.—That this Act shall take effect and be in force on and after four months from its passage.

C REGULATIONS GOVERNING SHIP AND LAND RADIO STATIONS.

Ship Stations.

1. On vessels coming under the Ship Acts, an emergency power supply, independent of the vessel's main electric power plant, must be provided which will enable radio messages to be sent for at least four hours over a distance of at least 100 miles day or night. The emergency power supply and equipment should be located and installed in such manner as to afford maximum protection against accident.

2. The radio transmitting apparatus, operated from the emergency power supply, should be capable of functioning within two minutes after unexpected notice to the operator.

3. The complete equipment must be maintained in an efficient condition at sea.

4. The complete emergency equipment should be tested before each sailing and daily at sea by the operator or an inspector and a note of its performance entered in the radio log.

5. Radio inspectors or other duly authorised officers of the Government will occasionally call for test messages to be sent by means of the emergency apparatus, while the vessel is at sea.

6. An "induction coil" connected to "plain aerial" is not recommended as emergency apparatus on account of the high voltages produced which frequently damage the antenna insulation and on account of "vibrator troubles."

7. A motor generator or rotary converter operated by storage battery is probably the most satisfactory means available at present of energising the transmitting apparatus.

8. Any auxiliary engine for wireless purposes must operate on a fuel which will fulfill the requirements of Rule XI, section 5, of the General Rules and Regulations of the Steamboat Inspection Service, reading as follows:

> None of the inflammable articles specified in section 4472, Revised Statutes, or oil that will not stand a fire test of 300° F. shall be used as stores on any pleasure steamer or steamer carrying passengers except that vessels not carrying passengers for hire may transport gasoline or any of the products of petroleum for use as a source of motive power for motor boats or launches of such vessels. (Sec. 4472, R.S.)

9. Every ship station shall carry a reasonable number of spares of such parts of both the main and emergency radiotelegraph equipments as are subject to undue wear, deterioration, or liability to accident.

10. One extra pair of head telephones, extra cords, and extra detectors must always be kept on hand.

11. A storage battery voltmeter, hydrometer, a supply of electrolyte, and distilled water should be part of the regular equipment, but are not prescribed in terms by statute. The absence of these and similar inexpensive emergency articles will be brought to the attention of the master and of the company installing the apparatus by the radio inspector, in writing, and if after a reasonable interval they have not been supplied, the inspector will communicate the fact to the Commissioner of Navigation.

12. The vessel's electric power for the operation of the main equipment shall, at all times while the steamer is under way, be available for the radio operator's use. On steamers where the dynamo is not run continuously there should be an efficient means of communication between the radio room and the dynamo room, in order that the radio operator may signal for power, as the law provides that he may not leave his post of duty.

13. Efficient communication between the radio room and the bridge must be maintained. A speaking tube or telephone will comply with this requirement. A bell and messenger service will not be acceptable unless there are special conditions justifying this equipment. The speaking tube or telephone must terminate in the radio room and on the bridge, or in the chart room if readily accessible from the bridge. If the radio room is adjacent to or accessible from the bridge so that orders may be transferred direct, no means of communication will be required. Any arrangement calling for the services of a third person to transmit the message will not be satisfactory. The radio inspectors will notify the ship authorities whether the means of communication provided is satisfactory at the time of inspection.

14. On vessels of the United States it is the statutory duty of the master to see that one operator is on duty at all times. The radio service of the ship is under the supreme authority of the master.

15. Masters should require operators on duty to communicate with the officer on the bridge every half hour.

16. Operators must make entries on the radio log *every fifteen* minutes, as evidence that a continuous watch is being maintained. The entries must, if possible, consist of the call letters of other stations communicating and a few words of the intercepted messages.

17. When vessels are in port the key to the radio room must at all times be on board in charge of the proper officer and the radio equipment shall be in such condition as to facilitate Government inspection.

Classification of Ship Stations and Grades of Operators Required.

18. First Class: Vessels having a continuous service. There shall be placed in the first-class vessels which are intended to carry twenty-five or more passengers:

(1) If they have an average speed in service of fifteen knots or more.

(2) If they have average speed in service of more than thirteen knots, but only subject to the twofold condition that they have on board 200 persons or more (passengers and crew), and that, in the course of their voyage, they go a distance of more than 500 sea miles between any two consecutive ports.

19. Second Class: Vessels having a continuous *watch* but a *service* of limited duration. Other vessels placed in the second class *must*, during navigation, maintain a continuous *watch* for at least seven hours a day, and a *watch* of ten minutes at the beginning of every other hour.

20. Third Class: Vessels which have no fixed periods of service. All vessels which are placed neither in the first nor in the second class shall be placed in the third class.

21. *Service* may be defined as preparedness to transmit and receive radio messages or signals at the rate of at least twenty words per minute.

22. *Watch* may be defined as preparedness to receive distress signals and call letters slowly. A "watcher" or cargo-grade operator will summon a first or second class operator if necessary.

23. All American vessels required by the Act of July 23rd, 1912, to be equipped with radio apparatus, and operators *must* at all hours maintain a continuous *watch*; that is to say, an operator or *watcher* must be "listening-in" continuously. This requirement is outside of and above the requirement based on the classification under which the ship's station is licensed.

24. Vessels voluntarily equipped are not required to maintain this continuous *watch*. Vessels voluntarily equipped are, however, subject to the following requirements as to *watch* according to the class assigned to them in their station licences.

25. If a licence of the second class be issued to a voluntarily equipped vessel, the station *must* maintain a continuous *watch* for at least seven hours a day and a *watch* of ten minutes at the beginning of every hour.

26. The grade of operators required on vessels of each class are prescribed in the London Convention Service Regulations, Article X. A continuous *watch* may be maintained by one commercial second-grade operator and one cargo-grade operator on cargo steamers.

27. Passenger vessels coming under the Act of July 23rd, 1912, which carry or are licensed to carry twenty-five or more passengers, *must* be placed in the first class:

(*a*) If they have an average speed in service of fifteen knots or more.

(*b*) If they have an average speed in service of more than thirteen knots, but only subject to the twofold condition that they have on board 200 persons or more (passengers and crew), and that in the course of their voyage they go a distance of more than 500 sea miles between any two consecutive ports.

The *service* shall be carried on by at least two commercial first-grade operators.

28. Cargo vessels coming under the Act of July 23rd, 1912, which are required to maintain a continuous *watch*, *must* be placed in the second class if continuous *service* is not maintained. On cargo steamers a continuous *watch* may be maintained by at least one commercial second-grade operator and one cargo-grade operator.

29. Passenger vessels coming under the act of July 23rd, 1912, but which are not *required* to be entered in the first class, *may* be entered in the first or second class, according to whether continuous *service* or continuous *watch* is maintained. The number and grade of operators required is determined by *service* or *watch*. On passenger vessels coming under the Ship Act but entered in the second class at least two second-grade operators are required to maintain continuous watch.

30. Cargo vessels which coming under the Act of July 23rd, 1912, and are required to maintain a continuous *watch*, may be placed in the first class, if continuous *service* is maintained. (For operators, see par. 28.)

31. All vessels voluntarily equipped with radio apparatus and which have no specified hours of *service* or *watch* must be placed in the third class.

32. Any vessel voluntarily equipped may be placed in the first-class if continuous *service* is maintained, or in the second class if a continuous *watch*, or a watch of limited duration, such as specified above for vessels of the second class is maintained.

33. In all ship stations transmissions shall be made only by operators holding commercial first or second grade licences or higher.

34. Commercial *service* shall be maintained by not lower than commercial first-grade operators.

35. Vessels which are voluntarily equipped with radio apparatus for their own convenience and for the correspondence of officers and crew must employ at least one commercial second-grade operator or higher.

36. Radio telephone apparatus on vessels not coming under the Act of July 23rd, 1912, must be operated by a person holding a cargo-grade licence or higher.

37. The owners of ship stations desiring to change the classification of a ship must apply for a new licence.

Land Stations.

38. Coast stations are stations which transmit messages to vessels at sea or on the Great Lakes, or whose operations can interfere with the exchange of messages between ship and ship or ship and coast. The principal purpose of the regulation of radio communication, international and national, is to secure the greatest efficiency of maritime communication through this agency, especially as a means of promoting safety to life.

39. Inland stations are stations which cannot transmit messages to vessels at sea or on the Great Lakes and whose operations cannot affect the transmission of messages between ship and ship or ship and coast. This may be due to their geographical location or to their range, dependent on power and aerial, or conditions. In some instances actual inspection may be necessary to determine whether a station should be licensed as a coast station or an inland station. An operator or owner in doubt as to the classification of his station should communicate the facts to the radio inspector of his district when applying for a licence.

40. Stations are bound to give absolute priority to calls of distress from ships, to similarly answer such calls, and to take such action with regard thereto as may be required.

41. The working of stations shall be organised as far as possible in such manner as not to disturb the service of other stations.

42. All coast stations (par. 38), excepting general and restricted amateur stations, are required to be able to transmit on the wave-lengths of 300 and 600 metres for the purpose of transmitting or relaying distress messages or signals and messages relating thereto, if necessary.

43. Coast stations primarily intended for long waves and long-distance transmission may instal an auxiliary antenna and auxiliary transmitter to comply with the short wave-length requirements.

44. The international standard wave-length is 600 metres, and the operators of all *coast stations* are required, during the hours the station is in operation, to "listen-in" at intervals of not less than fifteen minutes and for a period of not less than two minutes, with the receiving apparatus tuned to receive this wave-length, for the purpose of determining if any distress signals or messages are being sent and to determine if the transmitting operations of the "listening station" are causing interference with other radio communication.

45. General public service may be defined as "paid business," conducted on commercial wave-lengths between ship and shore or ship and ship.

46. Limited public service may be defined as "paid business" between certain designated

land stations, ships or lines of ships, and must be conducted on some authorised wave-length other than 300 or 600 metres.

47. All special service must be conducted on some authorised wave-length other than 300 or 600 metres, not interfering with general public service.

48. Limited commercial, special amateur, and all stations which have no authorised rates, shall not transmit or accept public correspondence from other stations, except in case of emergency.

49. If a general public-service coast station also maintains a limited commercial service with other stations on land or with vessels at sea, the limited commercial service must be conducted on some authorised wave-length other than 300 or 600 metres, but this service can be authorised on a general public-service coast station licence without stating the specific hours, it being understood that the limited commercial service is conducted only when no general public service business is on file.

50. If a general public-service coast station also maintains a public service between fixed points on land, the service between the land stations must be conducted on some authorised wave-length other than 300 or 600 metres, and a separate form, No. 761, should be submitted covering "Limited public service," giving the exact hours of such service.

CLASSIFICATION OF LAND STATIONS AND GRADES OF OPERATORS REQUIRED.

51. Both coast stations (the word "coast stations," "shore stations," and "coastal stations" are used interchangeably) and inland stations are divided for the purposes of the administration of the Act into the following classes:

(1) Public-service stations—
  (*a*) General,
  (*b*) Limited.
(2) Limited commercial stations.
(3) Experiment stations for the development of radio communication.
(4) Technical and training school station.
(5) Special amateur stations.
(6) General amateur stations.
(7) Restricted amateur stations.

52. CLASS 1.—(*a*) *Public-Service stations, general*, are those open to general business between coast and ships and include those operated by common carriers under the Act of February 4th, 1887, to regulate commerce, amended June 18th, 1910. They are required to maintain a constant *service* when open. Every coastal station open to public service shall at all times be ready to receive messages of such wave-lengths as are required by the International Convention in force. (Sec. 4, Regulation 1, Act of August 13th, 1912.) The station rates are authorised in the licence and published in the Official Berne List. Whenever such stations do not insure a constant service, transmitting and receiving day and night without interruption, the Secretary of the Navy is directed to open naval radio stations within 100 miles thereof to public business. (Sec. 4, Regulation 18, Act of August 13th, 1912.) The Secretary of War is authorised by the Act of May 26th, 1900 (31 Stat., 206), to open Alaskan military stations to public service.

53. General public service shall be conducted only by operators holding commercial first-grade licences or higher.

54. CLASS 1.—(*b*) *Public service stations, limited*, are reserved for a limited public service, determined by the object of the correspondence or other circumstances independent of the system employed. Stations of this class transmit and receive public messages to and from certain stations only, which are designated in the licence. The rates are authorised in the licences, and if not published in the official list they may be obtained from the licensee.

55. The service of limited public service *coast* stations shall be carried on by commercial first-grade operators or higher.

56. The service of limited public service *inland* stations shall be carried on by commercial second-grade operators or higher.

57. CLASS 2.—*Limited commercial stations* are not open to public service and are licensed for a specific commercial service or services defined in the licence. Stations of this class must not transmit to or accept public messages from other stations. No rates are authorised.

58. If a coast station, the operators shall hold a commercial second-grade licence or higher. (Par. 57.)

59. CLASS 3.—*Experiment stations.*—Thy Secretary of Commerce is authorised be section 4 of the Act to grant special temporary licences "to stations actually engaged in conducting experiments for the development of the science of radio communication, or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave-lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations." Applicants for such licences should state any technical result they have already produced, their technical attainments, etc. The fact that an applicant desires to experiment with his equipment does not justify or require a licence of this class. Most experiments can be made within the limitations of general and restricted amateur station licences or by use of an artificial antenna to prevent radiation.

60. Experiment stations may be operated by a person holding an experiment and instruction grade licence or higher.

61. CLASS 4.—*Technical and training-school stations* will be licensed, according to the degree of technical training attained and imparted and to local conditions.

62. The grade of operators required will be specified when the licence is issued.

63. CLASS 5.—*Special amateur stations* may be licensed by the Secretary of Commerce to use a longer wave-length and a higher power on special application. Applications for this class from amateurs with less than two years' experience in actual radio communication will not be approved. The application must state the experience and purpose of the applicant, the local conditions of radio communication, especially of maritime radio communication in the vicinity of the station, and a special licence will be granted only if some substantial benefit to the art or to commerce apart from individual amusement seems probable. (Sec. 4, Regulation 15, Act of August 13th, 1912.)

64. Special amateur *coast* stations must be operated by a person holding a commercial second-grade licence or higher. Inland stations may be operated by persons holding amateur second-grade licences or higher.

65. CLASS 6.—*General amateur stations* are

restricted to a transmitting wave-length not exceeding 200 metres and a transformer input not exceeding 1 kw. (Sec. 4, Regulation 15, Act of August 13th, 1912.)

66. CLASS 7.—*Restricted amateur stations*, within five nautical miles of a naval or military station, are restricted to a wave-length not exceeding 200 metres and to a transformer input not exceeding ½ kw. (Sec. 4, Regulation 16, Act of August 13th, 1912.)

67. Amateur first or second grade operators or higher are required for general and restricted amateur stations.

68. The licence does not specify the number of operators required, but provides that the station shall at all times while in operation be under the care of an operator licensed for that purpose. The grade and number of operators as required by law is determined by the service of the station.

69. *Special stations for exceptional distances* are land stations designed to carry on trans-oceanic radio communication as between the United States and European countries, or between the Pacific coast and Hawaii, or from the United States over similar long distances at sea to another land station, or (inland) to carry on radio communication overland over exceptional distances. These stations will all come under one of the classifications named above and the licence will indicate the stations for which communication is authorised and indicate the range.

REGULATIONS COMMON TO LAND AND SHIP STATIONS.

70. Any change in the characteristics of the radio apparatus or service of the station must be authorised by the Secretary of Commerce.

71. Every land and ship station open to general public service shall have, as a part of the station equipment, a copy of the Official Berne List of Radiotelegraph Stations and supplements thereto, as issued to comply with section 2 of the Act of July 24th, 1910. Information concerning the use of this list and method of procuring it is given on page 72, paragraph 196.

72. The service regulations of the London Convention, Article VII., paragraphs 1 and 2*b*, require a reduction of power or range under certain conditions. A proper resistance, impedance coil, or reactance regulator in the primary circuit is recommended. In certain cases the reduction of voltage or decreasing of coupling may be approved upon recommendations of radio inspectors.

73. Persons or corporations holding licences for radio stations, either land or ship, if practicable, must submit the licence to the radio inspector for the district, whenever the station or vessel goes out of commission for a period exceeding three months. The Commissioner of Navigation should be notified promptly of any intention to suspend or discontinue the service of any commercial station.

74. If there is no intention to resume the same service or if the station or vessel will enter a different service from that indicated by the licence, the radio inspector will submit the licence to the Bureau, together with a statement of the facts. Otherwise the radio inspector may retain the licence in his files for safekeeping until the date of its expiration, when it will be forwarded to the Bureau for cancellation.

75. When the station goes into commission the owner may apply to the radio inspector for the return of the licence. The radio inspector will satisfy himself that the station corresponds to the schedule of the station as shown in the licence, and if so, the licence will be returned.

76. Stations desiring to conduct tests should communicate with the radio inspector by letter or telephone, stating the probable length of time that will be required. Stations conducting such tests or temporary experiments should "listen-in," to determine that no interference is being caused, and during the tests should "listen-in" frequently for the interference signal, "QRM." Stations conducting tests should transmit their official call signal frequently. Attention is invited to the Act of August 13th, 1912, section 5:

> That every licence granted under the provisions of this Act for the operation or use of apparatus for radio communication shall prescribe that the operator thereof shall not wilfully or maliciously interfere with any other radio communication. Such interference shall be deemed a misdemeanour, and upon a conviction thereof the owner or operator, or both, shall be punishable by a fine not to exceed five hundred dollars or imprisonment for not to exceed one year, or both.

77. The Department holds that interference caused by tests of the character described above (par. 76) is "wilful" when no "listening-in" precautions are taken and the call signal of the station sending is not repeated at intervals.

APPLICATIONS FOR SHIP AND LAND STATION LICENCES, RENEWALS, AND DUPLICATES.

78. The Act does not apply either afloat or ashore to—

(*a*) Apparatus for radio communication which merely receives radiograms and is not equipped for sending.

(*b*) Apparatus for the transmission of radiograms exclusively between points in the same State, if the effect of such transmission does not extend beyond the State (so as to interfere with the radio communication of other States), or if the effect of such transmission does not interfere with the reception of radiograms from beyond the State (so as to interfere with the interstate radio communication of that State).

(*c*) Apparatus for radio communication which has been issued to the Organised Militia by the War Department or to the Naval Militia by the Navy Department and is used for official purposes only.

79. The owner or operator of any apparatus who may be in doubt whether his apparatus, under this paragraph, is exempt from licence may write the facts to the radio inspector for his district before applying for a licence.

80. The apparatus for transmission of radiograms, or signals on any vessel of the United States not permanently moored, requires a licence.

81. Apparatus for radio communication on land within the jurisdiction of the United States (excluding the Philippine Islands and excluding apparatus of the Government of the United States) must be licensed if—

(*a*) The apparatus is a means of commercial intercourse among the several States or with foreign nations; or

(*b*) The apparatus transmits radiograms or signals the effect of which at any time extends beyond the State; or

(*c*) The apparatus interferes with the receipt of messages in any State from beyond such State.

82. Station licences for the use and operation of apparatus for radio communication under the Act may be issued only to citizens of the United States or Porto Rico or to a company incorporated under the laws of some State or Territory or of the United States or Porto Rico.

83. Licences can be issued to clubs if they are incorporated or if a member will accept the responsibility for the operation of the apparatus, carrying with it the possibility of being penalised for infraction of the laws.

84. Applications for station licences of all classes should be addressed to the United States Radio Inspector for the district in which the station is located, who will forward the necessary blank forms and information. The limits of the districts and addresses of radio inspectors are given on Page 68, paragraph 166.

85. Upon receipt of the forms, properly completed, the radio inspector will make a thorough inspection of the station if practicable.

86. When applications and forms have been properly submitted, the stations may be operated in accordance with the laws and regulations governing the class of station for which application for licence has been made, until such time as the application can be acted upon unless the applicant is otherwise instructed and provided temporary official call letters are assigned.

87. General and restricted amateur-station licences are issued directly by radio inspectors. Station licences of all other classes are issued from the office of the Commissioner of Navigation, Department of Commerce. Applications and forms are forwarded by radio inspectors with recommendations by them.

88. Stations desiring to operate different portions of the day under different classifications shall submit application for each service, giving exact hours for each. If approved, each classification will be specified in the licence.

89. The owner of an amateur station may operate his station in accordance with the laws if his application for a licence has been properly filed, but has not been acted upon. An application for an operator's licence must also have been filed, and every effort made to obtain the licence before the station may be operated.

90. "Provisional" station licences are issued to amateurs remote from the headquarters of the radio inspector of the district in which the station is located. These licences are issued as a matter of convenience and record. If, upon inspection, the station is found to comply with the law, the inspector will strike out the word "Provisional" and insert the date of inspection and his signature at the bottom of the licence.

91. If such a station is found not to comply with the law the provisional licence may be cancelled until such time as the apparatus is readjusted to meet the requirements of the law: *Provided, however*, That consideration will be given to any reports of interference filed against such a station.

92. All persons are warned that it is unlawful to operate stations after licences have expired unless application for renewal has been properly made.

93. Owners desiring to renew licences must complete new forms as prescribed for original applications. Amateur-station licences issued on current forms may be renewed by the following endorsement on the back, provided no changes in the equipment or location have been made; otherwise a new licence will be issued: "This licence renewed for one year. .... Radio Inspector." The Commissioner of Navigation will be notified of the name and call signal in every case of renewal in this manner.

94. Any person applying for a duplicate licence to replace an original which has been lost, mutilated, or destroyed will be required to submit an affidavit to the Bureau of Navigation through the radio inspector of the district, attesting the facts regarding the manner in which the original was lost. The Commissioner of Navigation will consider the facts in the case and advise the radio inspector in regard to the issue of a duplicate licence or a duplicate will be forwarded through the inspector's office.

95. A duplicate licence will be issued under the same serial number as the original and will be marked "Duplicate" in red across the face.

REGULATIONS GOVERNING RADIO OPERATORS.

Grades and Requirements.

D 96. (1) Commercial extra first grade; (2) commercial first grade; (3) commercial second grade; (4) commercial cargo grade; (5) commercial temporary permit; (6) experiment and instruction grade; (7) amateur first grade: (8) amateur second grade.

97. The Service Regulations of the International Convention require that "the servic of the station on ship board shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject."

98. Such certificate shall attest the professional efficiency of the operator as regards—

(*a*) Adjustment of the apparatus and knowledge of its functioning;

(*b*) Transmission and acoustic reception at the rate of not less than twenty words a minute (Continental Morse) for commercial first-grade operators and not less than twelve words per minute for second-grade operators;

(*c*) Knowledge of the regulations governing the exchange of wireless telegraph correspondence.

(*d*) The certificate shall furthermore state that the Government has bound the operator to secrecy with regard to the correspondence.

99. The International Convention has been ratified by the principal maritime nations, dominions and provinces. Radio operators holding valid certificates issued by foreign Governments which are parties to the con vention will be recognised by this department as persons "skilled in the use of such apparatus" within the meaning of the Act, unless in the case of a specific individual there may be special reason to doubt the operator's skill and reliability. Such certificates should be ready at hand for the inspection of radio inspectors or customs officers before the steamer departs from the United States.

100. In the case of a vessel subject to the Act under the flag of any nation not a party to the International Convention, the radio operator, before the departure of the vessel from the United States, must furnish to the inspector evidence that he is "skilled in the

use of the apparatus." This evidence shall consist of an examination on board by the radio inspector.

101. *Commercial extra first grade.*—The Department of Commerce will issue a special licence, to be known as commercial extra first grade to radio operators whose trustworthiness and efficient service entitle them to confidence and recognition.

102. These licences will be given consideration by the Civil Service Commission in examinations for positions requiring knowledge of radio telegraphy, when experience is rated as a part of such examinations.

103. Applicants for the commercial extra first-grade licence must pass a special examination. To be eligible for this examination they must hold commercial first-grade licences, and their certificates of skill in radio communication, issued under the Act of June 24th, 1910, or licences under the Act of August 13th, 1912, must record eighteen months' satisfactory commercial service at sea or at land stations, either or both, during the two years previous to the filing of the application for examination, as shown by endorsement on the licence service records, or other satisfactory evidence, and provided that the applicants have not been penalised for a violation of the radio laws and regulations.

104. A speed of at least thirty words per minute, Continental Morse, and twenty-five words per minute, American Morse (five letters to the word), must be attained. The technical questions and the questions on the radio laws and regulations will be considerably wider in scope than those for commercial first grade, and a higher percentage will be required.

105. All examination papers, including the code test sheets, will be marked and forwarded to the Commissioner of Navigation, with a recommendation by the radio inspector or examining officer. Examination papers will be marked upon the basis of 100, and licenses will be recommended only if eighty or better is attained.

106. Licences of this grade will be issued by the Commissioner of Navigation, endorsed by the Secretary of Commerce, and delivered to the successful applicant through the examining officer.

107. *Commercial first grade.*—The applicant must pass a satisfactory examination in—

(*a*) The adjustment, operation, and care of the apparatus, including correction of faults and change from one wave-length to another.

(*b*) Transmitting and receiving by ear at a speed of not less than twenty words a minute in Continental Morse (five letters to the word).

(*c*) Use and care of storage battery or other auxiliary power apparatus.

(*d*) Knowledge of the international regulations in force applying to radio communication.

(*e*) Knowledge of the requirements of the Acts of Congress to regulate radio communication (secs. 3, 4, 5, 6, and 7 of the Act of August 13th, 1912).

108. The commercial extra first grade and the commercial first-grade licences qualify holders for employment at any ship or land station of any class.

109. *Commercial Second grade.*—The applicant must pass a satisfactory examination in all the subjects prescribed above for the first grade, with the exception that the minimum speed in transmitting and receiving shall not be less than twelve words a minute in Continental Morse, and the examination in the subjects will not be as comprehensive as that given first-grade operators.

110. *Commercial cargo grade.*—Section 2 of the Act of July 23rd, 1912, provides: "On cargo steamers, in lieu of the second operator provided for in this Act, there may be substituted a member of the crew or other person who shall be duly certified and entered in the ship's log as competent to receive and understand distress calls or other usual calls indicating danger, and to aid in maintaining a constant wireless watch so far as required for the safety of life."

111. The examination will be conducted so as to determine the following facts:

(*a*) That the applicant is sufficiently familiar with the Continental Morse Code to recognise the distress signal (SOS), when included in a list of other words or signals sent slowly (approximately five words a minute).

(*b*) That the applicant is sufficiently familiar with the Continental Morse Code to recognise radio call letters of the vessel on which he desires to operate when sent slowly and repeated several times.

(*c*) That the applicant is sufficiently familiar with the type of the receiving apparatus of the vessel on which he desires to operate to determine by a buzzer or similar test that the detector or receiving apparatus is properly adjusted to receive signals.

112. Examining officers and radio inspectors are authorised to issue a certificate, in the form of an amateur first-grade licence, after examination, to indicate the facts above enumerated in the case of a member of the crew or other person, and experience under this form will be credited by examining officers if the holder later applies for examination for a commercial licence. These licences will be marked "Cargo" in the upper right-hand corner under the serial number.

113. *Commercial temporary permit.*—Section 3 of the Act of August 13th, 1912, provides: "In case of emergency the Secretary of Commerce may authorise a collector of customs to issue a temporary permit, in lieu of a licence, to the operator on a vessel subject to the Radio Ship Act of June 24th, 1910."

114. The temporary permit, in the form of a letter to the operator, is to be issued only in cases of emergency and will be valid for one voyage from.............. to .... beginning ...., unless the proper licence or properly licensed operator can be obtained en route.

115. The permits should be issued only to persons who the collector of customs has reason to beli ve are skilled in the use of the apparatus, but have not had the opportunity to present themselves for examination before Government officers authorised to conduct examinations and furnish licences.

116. The collector of customs will forward to the Department of Commerce (Bureau of Navigation) a report covering each temporary permit issued and the reasons for its issue.

117. *Experiment and instruction grade.*—Experimenters and instructors of scientific attainments in the art of radio communication whose knowledge of the radio laws satisfies the radio inspector or the examining officer may obtain this grade licence, provided they are able to transmit and receive in the

Continental Morse Code at a speed sufficient to enable them to recognise distress calls or the "keep-out" signals.

118. The operator's licence for this grade is a commercial licence, endorsed by the Secretary of Commerce with a statement of the special purpose for which it is valid.

119. If the applicant qualifies, the radio inspector or examining officer will forward a blank commercial licence with the papers, to the Commissioner of Navigation, with his recommendation. If approved, the licence will be properly endorsed by the Secretary of Commerce and delivered to the licensee through the recommending officer.

120. This licence has no reference to the instruction of radio operators as such, but is required by those operating apparatus licensed as experimental stations but who are unable to obtain commercial grade operators' licences.

121. Amateurs before applying for licences should read and understand the essential parts of the International Radiotelegraphic Convention in force and sections 3, 4, 5, and 7 of the Act of August 13th, 1912. The Department recognises that radio communication offers a wholesome form of instructive recreation for amateurs. At the same time its use for this purpose must observe strictly the rights of others to the uninterrupted use of apparatus for important public and commercial purposes. The Department will not knowingly issue a licence to an amateur who does not recognise and will not obey this principle. To this end the intelligent reading of the International Convention and the Act of Congress is prescribed as the first step to be taken by amateurs. A copy of the radio laws and regulations may be procured for this purpose from the radio inspectors or from the Commissioner of Navigation, Department of Commerce, Washington, D.C., but they are not for public distribution. Additional copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C., at a nominal price.

122. *Amateur first grade.*—The applicant must have a sufficient knowledge of the adjustment and operation of the apparatus which he wishes to operate and of the regulations of the International Convention and Acts of Congress in so far as they relate to interference with other radio communication and impose certain duties on all grades of operators. The applicant must be able to transmit and receive in Continental Morse at a speed sufficient to enable him to recognise distress calls or the official "keep-out" signals. A speed of at least ten words per minute (five letters to the word) must be attained.

123. *Amateur second grade.*—The requirements for the second grade will be the same as for the first grade. The second-grade licence will be issued only where an applicant can not be personally examined or until he can be examined. An examining officer or radio inspector is authorised in his discretion to waive an actual examination of an applicant for an amateur licence, if the amateur for adequate reasons cannot present himself for examination but in writing can satisfy the examining officer or radio inspector that he is qualified to hold a licence and will conform to its obligations.

Examinations.

124. The following requirements and method of conducting examination for radio operators' licences will be adopted at all examining offices.

125. The test shall consist of messages with call letters and regular preambles, conventional signals and abbreviations and odd phrases, and shall in no case consist of simple, connected reading matter. The test will be conducted by means of the omnigraph or other automatic instrument wherever possible.

126. The test shall continue for five minutes at a speed of twenty words, twelve words and ten words per minute, respectively, for the commercial first, second, and lower grades, and to qualify the applicant must receive twenty, twelve, or ten words in consectuive order.

127. The code test sheets written by the applicant will be forwarded to the Commissioner of Navigation with other papers and the speed attained noted in the lower left-hand corner of the first sheet.

128. An applicant will be given credit for the maximum speed he can attain.

129. The practical and theoretical examination shall consist of seven comprehensive questions under the following headings and values:

	Points, maximum value.
(*a*) Experience..	20
(*b*) Diagram of receiving and transmitting apparatus	10
(*c*) Knowledge of transmitting apparatus	20
(*d*) Knowledge of receiving apparatus	20
(*e*) Knowledge of operation and care of storage batteries	10
(*f*) Knowledge of motors and generators	10
(*g*) Knowledge of international regulations governing radio communication and the United States radio laws and regulations	10
	100

130. Seventy-five constitutes a passing mark for the first-grade commercial. Sixty-five constitutes a passing mark for the second grade commercial.

131. Applicants who fail to attain twenty words in the code test but who attain a mark of between sixty-five and seventy-five in the written examination may be issued second-grade licences, if they can receive at least twelve words per minute.

132. Question (*a*) shall determine the applicant's practical knowledge and experience in handling radio apparatus. An applicant's experience will be determined largely from the personal question sheet, and from satisfactory letters or references submitted. Experience, operating first-class amateur apparatus, or the apparatus provided in good training schools, will be given a reasonable value, but applicants who have had experience as apprentices at commercial shore stations or on board vessels will receive higher marks.

133. No applicant who fails to qualify will be re-examined at any examining office within three months from date of the previous examination. All examination papers, whether the applicant qualifies or not, will be forwarded to the Bureau of Navigation for filing as "Operator's record." When the records of the Bureau develop the fact that an applicant has failed to qualify and has applied for re-examination or been re-examined at the same or another office within three months,

his existing licence may be suspended or revoked by the Secretary of Commerce. Applicants to whom are issued second-grade licences will not be examined for first-grade within three months under the same rule.

PLACES WHERE EXAMINATIONS ARE HELD.

134. (Excised).

135. Naval radio stations: San Juan, P. R.; Colon, R.P.; Honolulu H.T.;

136. United States Army stations: Fort Omaha, Nebr.; Fort St. Michael, Alaska; Fort Valdez, Alaska.

137. Bureau of Navigation, Department of Commerce, Washington, D.C.

138. Radio inspectors, at their offices and elsewhere, by special arrangement.

139. Additional opportunities for taking the examination will be afforded as may be deemed necessary, and these special dates and places may be ascertained by communication with the Commissioner of Navigation, or nearest radio inspector.

140. All licences, when awarded, will be delivered through the officer who conducted the examination.

141. Examinations for the commercial extra first-grade licences will be held at the following offices only by appointment.

142. Commandants, navy yards: Boston, Mass.; Brookly, N.Y.; Philadelphia, Pa.

143. United States radio inspectors, customhouses: New Orleans, La.; San Francisco, Cal.; Seattle, Wash.; Cleveland, Ohio; Chicago, Ill.

144. Commissioner of Navigation, Department of Commerce, Washington, D.C.

145. In special cases, upon application to the Commissioner of Navigation, arrangements may be made for examinations at other points.

APPLICATIONS FOR EXAMINATIONS FOR RADIO OPERATORS' LICENCES, RENEWALS, AND DUPLICATES.

146. An operator's licence may be granted to any person without regard to sex, nationality or age if the applicant can fulfil the requirements for the class of licence desired.

147. Applicants for licences should communicate in writing with the commandants, commanding officers, or officers in charge at navy yards, and army posts, with the Commissioner of Navigation, or radio inspectors, in order to fix the date when they can be examined. (See pars. 134–145.)

148. Commercial licences can only be obtained by personal examination. Where applicants are at remote points or can not proceed to examining offices, efforts will be made to examine them through radio inspectors when they are in that vicinity, but special trips can not be made for that purpose.

149. Amateurs should write to the nearest examining officer in their vicinity (see pars. 134–145) for Form 756 (application for operator's licence) and to the radio inspector in their vicinity for Form 757 (application for licence for land station). If the application for operator's licence is also made to the radio inspector, both applications should be forwarded in the same envelope.

150. Amateur operators at points remote from examining officers and radio inspectors may be issued second-grade amateur licences without personal examination. Examinations for first-grade licences will be given by the radio inspector when he is in that vicinity, but special trips can not be made for this purpose (see par. 123).

151. Persons holding radio operator's licences, amateur second grade, should make every effort to appear at one of the examination points to take the examination for amateur first-grade licence or higher.

152. Persons holding radio operator's licences of any grade should, before their licences expire, apply to the nearest radio inspector or examining officer for renewal and submit Form 756 in duplicate.

153. Radio operators of the commercial or cargo grades whose licences show on the service records satisfactory service for three months out of the last six months of the licence term may be issued new licences without re-examination. Other operators who submit satisfactory evidence to the examining officer, showing actual operations of radio apparatus for three months during the last six months of the licence term, may be issued new licences without re-examination. All others will be re-examined in the usual manner.

154. Whether or not a new licence is issued, the radio inspector or examining officer will forward one copy of Form 756, properly completed, to the Commissioner of Navigation, Department of Commerce. If a new licence is not issued, the reason therefor will be stated on the back of the form.

155. Any operator applying for a duplicate licence to replace an original which has been lost, mutilated, or destroyed will be required to submit an affidavit to the Bureau of Navigation through the radio inspector or examining officer who issued the original, attesting the facts regarding the manner in which the original was lost. The Commissioner of Navigation will consider the facts in the case and advise the radio inspector in regard to the issue of a duplicate licence. A duplicate licence will be issued under the same serial number as the original and will be marked "Duplicate" in red across the face.

156. Operators' licences are not valid until the oath for the preservation of the secrecy of messages is properly executed before a notary public or other officer duly authorised to administer oaths. Licences must indicate on their faces that the oath has been taken and the officer administering the oath on the back of the licence should sign also in the blank provided on the face.

157. Operators' licences should be framed and posted in the radio room, and licences for stations should be accessible at all times to inspectors.

158. Under the supervision of a licensed operator an apprentice or unlicensed person may learn the art by the actual use of the apparatus, but the licensed operator who fails to enforce obedience to the regulations by the apprentice or unlicensed person serving under his supervision is liable to penalties as if he had himself violated the regulations.

159. An individual record is kept in the Bureau of Navigation, Department of Commerce, at Washington, of each licensed operator. Each operator's examination papers and all reports in regard to interference or violations of the radio laws and regulations are filed for reference.

160. Radio operators holding licenses of any grade or class and applying for examination for any other grade or class must submit to the examining officer Form 756, in duplicate. If a new licence is issued the licence held by the applicant must be surrendered.

161. Radio operators who pass the examination for a higher grade licence are required to

surrender their existing licences, which will be forwarded to the Commissioner of Navigation with the other papers.

162. Operators desiring to retain their expired or cancelled licences may make application therefor to the Commissioner of Navigation.

GENERAL INFORMATION.

Administration and Administrative Districts.

163. The Department has established, for the purpose of enforcing, through radio inspectors and others, the acts relating to radio communication and the International Convention, the following districts, with the principal office for each district at the customhouse of the port named.

164. Communications for radio inspectors should be addressed as follows, and not to individuals: Radio Inspector, Customhouse, ... (city), ... (State).

165. Communications for the Bureau of Navigation should be addressed as follows, and not to individuals: Commissioner of Navigation, Department of Commerce, Washington, D.C.

166. (1) Boston, Mass.: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

(2) New York, N.Y.: New York (county of New York, Staten Island, Long Island, and counties on the Hudson River to and including Schenectady, Albany, and Rensselaer) and New Jersey (counties of Bergen, Passaic, Essex, Union, Middlesex, Monmouth, Hudson, and Ocean).

(3) Baltimore, Md.: New Jersey (all counties not included in second district), Pennsylvania (counties of Philadelphia, Delaware, all counties south of the Blue Mountains, and Franklin County), Delaware, Marlandy Virginia, District of Columbia.

(4) Savannah, Ga.: North Carolina, South Carolina, Georgia, Florida, Porto Rico.

(5) New Orleans, La.: Alabama Mississippi, Louisiana, Texas, Tennessee, Arkansas, Oklahoma. New Mexico.

(6) San Francisco, Cal.: California, Hawaii, Nevada, Utah, Arizona.

(7) Seattle, Wash.: Oregon, Washington Alaska, Idaho, Montana, Wyoming.

(8) Cleveland, Ohio: New York (all counties not included in second district), Pennsylvania (all counties not included in third district), West Virginia, Ohio, Michigan (Lower Peninsula).

(9) Chicago, Ill.: Indiana, Illinois, Wisconsin, Michigan (Upper Peninsula), Minnesota, Kentucky, Missouri, Kansas, Colorado, Iowa, Nebraska, South Dakota, North Dakota.

Reporting of Violations.

167. The regulations established by law, or by the authority of law, or of the International Convention, will be enforced by the Secretary of Commerce through collectors of customs, radio inspectors, and other officers of the Government.

168. The service regulations of the radio-telegraphic Convention in force provide that "no station on shipboard shall be established or worked by private enterprise without authority from the Government to which the vessel is subject." Such authority shall be in the nature of a licence issued by said Government. Stations on foreign ship will be licensed by their Governments respectively. Inspectors will report to the Commissioner of Navigation stations on foreign ships not so licensed.

169. A radio inspector is authorised in exceptional cases to act outside of his district for the convenience of commerce. In such cases he will communicate before or after acting with the inspector in whose district he has acted. Radio inspectors are authorised to communicate directly with collectors of customs and to co-operate with them in the enforcement of the law.

170. Violations of the laws and regulations will be reported to the chief customs officer of the district in which the offence occurs, who will report the case to the Secretary of Commerce (Bureau of Navigation), according to the procedure followed in violations of the navigation laws. Misdemeanours will be reported to the United States district attorney in the usual manner.

171. Collectors of customs and radio inspectors are enjoined that the reports required by paragraph 170 must be precise statements of the facts as the basis for possible proceedings by the United States attorney.

172. Violations by the master of a vessel of the United States of the provisions of the second paragraph of section 1 of the ship act will be reported to the collector of customs directly, and the usual procedure in cases of fines and penalties will be followed.

Inspection of Ship Stations.

173. The radio inspectors and customs officers, as far as practicable, shall visit steamers subject to the act before they leave port and ascertain if they are equipped with the apparatus in charge of the operators prescribed by law and regulation.

174. When the radio apparatus is certified as complying with the requirements of law by the competent authorities of a foreign Government, such certificate will be recognized by this Department, but the radio inspector or customs officer may, if he deem it necessary or desirable, satisfy himself that the apparatus is in good working order.

175. Whenever practicable the radio inspector shall satisfy himself on his visit before the departure of a steamer subject to the act of July 23rd, 1912, that the apparatus is efficient and in good working order within the meaning of the Act, and if satisfied he shall issue a certificate in the form of Appendix A (form 752). The duplicate of these certificates will be filed with the collector of customs as a record of the radio equipment on vessels sailing from his port.

176. These certificates will be issued only if the inspection is made within two hours of sailing time.

177. For each clearance the master of a steamer coming under the Act of July 23rd, 1912, is required to furnish to the customs officer a certificate in the form in Appendix B (Form 753). Such certificate shall be retained in the files of the collector of customs. Whenever the radio inspector is absent from his home port he will notify the collector of customs, who will arrange for the collection of certificates and survey of equipment.

178. Where a steamer subject to the radio law is without the apparatus and the operators prescribed, or either of them, and is about to attempt to leave port, the radio inspector or customs officer visiting the vessel shall:

(*a*) Furnish the master with a memorandum (stub of Form 771) of the particulars

in respect of which the law has not been complied with and the penalty;

(*b*) if convenient, notify the vessel's agents or the proper person in charge of the apparatus so that the necessary corrections may be made before sailing.

179. If a steamer clears in violation of the law, the radio inspector or customs officer shall submit to the collector of customs of the port a written report, stating the exact nature of the violation, the section of the law violated, and the penalties involved and all of the circumstances in connection therewith which will be of service to the collector and to the Secretary of Commerce in determining what action shall be taken. A copy of the report will be forwarded to the Commissioner of Navigation.

180. Statements should be obtained from operators, ships officers, or other witnesses at the time the violation is discovered and should accompany the report to the collector of customs.

181. The collector of customs will report the case to the Secretary of Commerce in the usual manner as a navigation fine case.

182. Merchant vessels chartered by the United States Government are subject to the Act of August 13th, 1912, in every case, if the radio apparatus is owned and operated by a commercial company.

183. Merchant vessels chartered by the United States Government for the transportation of persons or supplies are subject to the requirements of the ship act (Act of July 23rd, 1912), if the vessel is controlled and operated by the owners. Vessels commanded wholly or in part by Government officers are not subject to the ship act.

184. Government vessels or vessels charted by the Government are subject to the act of August 13th, 1912, if the radio equipment is owned and operated by private interests.

185. The ship act does not authorize the refusal of clearance in case of violation of its provisions, but specifically provides for the imposition of a fine in a sum not more than $5,000.

186. The act does not apply to a vessel at the time of entering a port of the United States. Radio inspectors and customs officers may, however, accept as evidence of the efficiency of the operators and the skill of an operator messages shown to have been transmitted and received by him over a distance of at least 100 miles, by day, during the voyage to the United States.

Operators on Foreign Vessels.

187. In so far as licensed operators are concerned a sharp distinction should be drawn between the act of July 23rd, 1912, which requires apparatus and operators for radio communication on steamers and the Act of August 13th, 1912, to regulate radio communication.

188. The Act of July 23rd, 1912, amending the Act of June 24th, 1910, is designed to promote safety at sea through the employment of apparatus and operators to transmit and receive distress calls and other calls relating to perils and aids to navigation. It provides that in the case of American and foreign vessels subject to its provisions "the radio equipment must be in charge of two or more persons skilled in the use of such apparatus." This Act does not require that the operators shall be licensed, and the penalty prescribed in section 3 of the Act is not incurred by the master of a vessel whose operators are "skilled in the use of such apparatus," even though they may not be licensed.

189. The Act of August 13th, 1912, is designed to execute in behalf of the United States the International Radiotelegraphic Convention and thus to promote orderly exchanges by radio communication. For this purpose the International Radiotelegraphic Convention (Service Regulations) provides that the service of the station on shipboard shall be carried on by a telegraph operator holding a certificate issued by the Government to which the vessel is subject.

190. Section 3 of the Act of August 13th, 1912, carries out this provision of the International Convention by providing licenses for operators on American vessels. If an unlicensed person serves in charge or in supervision of the use and operation of the apparatus both he and his employer are liable to a fine of not more than $100 or imprisonment for not more than two months or both. This section and penalty do not apply to operators on foreign ships. But operators on the ships of foreign nations signatory to the International Radiotelegraphic Convention, as shown above, are required to have certificates or licenses from their own governments, and if not so certificated, the obligations of the convention have not been observed. The convention in the Service Regulations provides for this situation.

191. The Act of July 23rd, 1912, as stated, requires that on American and foreign ships the operators must be "skilled in the use of such apparatus," but does not require that they must be licensed. To facilitate commerce and simplify administration, operators presenting American licenses or foreign certificates are accepted as "skilled in the use of such apparatus," except where there may be special reasons to doubt the operator's skill or reliability. Where operators on American or foreign ships do not have such licenses or foreign certificates, radio inspectors or customs officers under the act of July 23rd, 1912, may accept other competent evidence of skill or may examine such operators.

Official International List of Coast and Ship Radio Stations of the World and Station Rates.

192. The list of land and ship stations of the United States including amateurs, giving call letters, wave lengths, nature of service etc., can be procured from the Superintendent of Documents, Government Printing Office, Washington, D.C., at a nominal price.

193. Supplements to this list are issued quarterly and the list is revised annually, as of July 1st. Information concerning amateur stations will not be included in the supplements, but in the annual edition only.

194. The introduction to the list of "Radio Stations of the United States" contains information concerning the assignment of international and amateur call letters.

195. A copy of the Official Berne List, and supplements as issued, are required as a part of the equipment of every station open to general public service.

196. The International List of Radio Stations of the World (edition in English) can be procured from the International Bureau of the Telegraphic Union (Radiotelegraphic Service), Berne, Switzerland.

197. In addition to the information contained in the pamphlet of the United States stations, published by the Bureau of Naviga-

tion, the international list shows geographical locations, normal ranges in nautical miles, radio systems, and rates.

198. The international list includes the Government and commercial land and ship stations of the United States. The list is divided into three parts. The first part contains a list of ship stations, grouped by countries and arranged alphabetically; the second part contains a list of land stations arranged in the same manner; and the third part contains tables of land line and cable charges from coast radio stations to inland and various other points. In computing the total word rate applicable to a radiogram from a ship station to an inland point or vice versa, the three rates must be added. The rates in the international list are stated in francs. For approximate purposes 1 franc equals 20 cents and 5 centimes equals 1 cent. Supplements to the international list will be issued monthly, and will contain new stations and tables of alterations.

199. The International Alphabetical List of Call Letters (stations of the world) is also issued by the international bureau at Berne, and supplements will be issued monthly.

200. Neither the international list proper nor the supplements will contain a list of amateur stations.

201. Inquiries as to the subscription price of these lists should be made direct to the Berne bureau, at the address given above. (See par. 196.) Remittances to Berne should be made by international postal money order.

Miscellaneous Information.

202. Stations equipped to receive only do not require licenses.

203. Operators of receiving stations do not require licenses, but *all persons* are required to maintain secrecy in regard to messages, as provided in the Act of August 13th, 1912, nineteenth regulation of section 4.

204. Distances under the radio laws are computed in nautical miles.

205. No fees are charged for any operator or station license.

206. Licensed stations must be operated by or under the direct supervision of properly licensed operators.

207. Amateur stations within five miles of naval or military stations need not have been in actual operation on or before August 13th, 1912, to obtain a license for a restricted amateur station.

208. The master of a vessel shall have the right to censor all messages addressed to or transmitted by a radio telegraph station on board his vessel, but such master shall not divulge to any person (other than the properly authorized officials of the Government, or a competent legal tribunal) or make any use whatever of any message coming to his knowledge through the exercise of such censorship, nor shall the master or any operator divulge to any person (other than the properly authorized officials of the Government, or a competent legal tribunal) or make any use whatever of any message (other than a message of distress) coming to his knowledge and not intended for the said station.

209. The transmission of superfluous signals by any ship or coast station is absolutely prohibited; trials and practices are forbidden except under such circumstances as to preclude the possibility of interference with other stations.

210. No person shall transmit or make a signal containing profane or obscene words or language.

211. Additional or amendatory regulations will be issued from time to time as they may appear necessary.

Radio Service Form 752.

CERTIFICATE OF RADIO INSPECTION.

Port of ....
............., 191..

F This is to certify that I have to-day examined the apparatus for radio communication on the S. S. .... of which .... is master, about to leave this port for.........., and I have found the same efficient and in good working order, as prescribed by the act of June 24th, 1910, as amended by the Act of July 23rd, 1912.

(Signed) ....,
Radio Inspector.
(Or) ....
Customs Inspector.

Radio Service Form 753.

MASTER'S CERTIFICATE OF RADIO APPARATUS.

NOTICE.

G The radio equipment must be in charge of two or more persons skilled in the use of such apparatus, one or the other of whom shall be on duty at all times while the vessel is being navigated. Such equipment, operators, the regulation of their watches, and the transmission and receipt of messages, except as may be regulated by law or international agreement, shall be under the control of the master, in the case of a vessel of the United States; and every wilful failure on the part of the master to enforce at sea the provisions of this paragraph as to equipment, operators, and watches shall subject him to a penalty of one hundred dollars. (Act of July 23rd, 1912.)

Port of ....
.... 191..

This is to cetify that I have to-day examined the apparatus for radio communication on the S. S. ...., of which I am master, about to leave this port for ...., and I have found the same efficient and in good working order, as prescribed by the Act of June 24th, 1910, as amended by the Act of July 23rd, 1912.

(Signed) ...., *Master.*

No. ....

LICENCE FOR GENERAL PUBLIC SERVICE COAST RADIO STATION.

DEPARTMENT OF COMMERCE.

Bureau of Navigation.

RADIO SERVICE.

H Pursuant to the Act to regulate radio communication, approved August 13th, 1912, ..., a citizen of the State of ....
....
a company incorporated under the laws of the State of .... having applied therefor, is hereby granted by the Secretary of Commerce for a period of .... on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this licence to use or operate the apparatus for radio communication (identified in the schedule hereinafter) located in the State of .... city or town of ...., for the purpose

of transmitting to and receiving from ship stations and other land stations general public correspondence, Government and service correspondence, and distress signals and messages, at rates of compensation not in excess of those fixed by the international agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the schedule hereinafter.

2. The use or operation of apparatus for radio communication pursuant to this licence shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President "to the end that the same and every article and clause thereof may be observed and fulfilled with good faith by the United States and the citizens thereof, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States.

3. The authority conferred by this licence is subject to the provisions of the Act of February 4th, 1887, entitled "An Act to regulate commerce," as amended by the Act of June 18th, 1910, so far as the licensee may be within the operation of said Act, and except as provided in the Act of August 13th, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

4. The licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the licensee under such accounts.

5. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not wilfully or maliciously interfere with any other radio communication.

6. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

7. The station during the hours of operation shall listen in at intervals of not less than 15 minutes and for a period of not less than two minutes with the receiver tuned to receive messages of 300 meters wave length.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall exchange radiograms with any other commercial station and with any ship station without distinction of the radio systems adopted by such stations.

10. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Twelfth Regulation by the Act of August 13th, 1912.

11. The President of the United States in time of war or public peril or disaster is authorised by law to close the station and cause the removal therefrom of all radio apparatus or may authorise the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

12. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorised by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

13. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

SCHEDULE OF STATION AND APPARATUS.

Location: State, ..., County; ....; City or Town, ...; Street, ...; No. ....
....

Geographical location: Latitude, N...°..′..″ Longitude, W...°..′..″

Specific hours authorised during which the station must be open to service (local standard time):
....

Power: Transformer input, ...kw.

Normal day range in nautical miles with ships at sea..............

Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:
....
....

Call letters...........
..........; Coast charges: per word........, minimum per radiogram........
..........; Coast charges: per word........, minimum per radiogram........
..........; Coast charges: per word........, minimum per radiogram........

Radiotelegraphic system employed:........
....

Characteristics of transmitting system:
Type of spark gap, ...
Approximate spark frequency, ...
....

Characteristics of receiving system:
Type of receiver, ...
Wave-length of receiving system: From ....meters to........ metres.

Antenna: Number of masts, ...; Height, ..., ..., ..., ...
....

Type of aerial, ...
Wires: Number, ...; Size and kind, ...
Essential dimensions, ...
....
....

WAVE LENGTHS.

The normal sending and receiving wave length shall be........metres, and no other wave length shall be used for general public correspondence with any foreign ship or foreign coast station, except for long-range

public service or purposes other than general public correspondence.

The station shall at all times, except as provided in the seventh paragraph of this licence, be ready to receive messages of such wave-lengths as are required by the International Radiotelegraphic Convention; shall be prepared to use two sending wave lengths, one of 300 metres and one of 600 metres, as required by the International Radiotelegraphic Convention in force; and tuning positions on the receiver shall be plainly marked: Provided, That the Secretary of Commerce may, in his discretion, change the limit of wave length reservations to accord with any international agreement to which the United States is a party.

For long-range public service and for any service other than general public correspondence the station is authorised to use the following additional wave lengths under 600 or over 1,600 metres:

Meters, ...; Meters, ...; Meters, ...; Meters, ...; Meters, ...

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 10 per cent. of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

Sending wave length.*	Antenna current (amperes).	Logarithmic decrement.	Reading of wave meter indicating instrument.†	
			Principal wave.	Wave next in energy.
600 metres				
300 metres				
metres				
metres				
metres				
metres				

* Underscore normal.
† Type of indicating instrument..................

The station insures rapid exchange with land wire stations of the

....
(Company.)

....
(Location telegraph office.)

....
(Company.)

....
(Location telegraph office.)

in the following manner:..................
....

Satisfactory proof has been furnished that the station was actually operating August 13th, 1912.

This licence will expire on the............ day of............, 191..

....
Secretary of Commerce.

....
Commissioner of Navigation.

Washington, D.C..............191..

INSPECTIONS.

Date.	Inspector.	Remarks.

No........

LICENCE FOR SHIP RADIO STATION.

DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.
RADIO SERVICE.

I Pursuant to the Act to regulate radio communication, approved August 13th, 1912 .... a citizen of the State of.................. .... a company incorporated under the laws of the State of................, having applied therefor, is hereby granted by the Secretary of Commerce for a period of................, on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this licence to use or operate the apparatus for radio communication (identified in the schedule hereinafter) on the .... called..
(Type of vessel.)
......................, a vessel of the
(Name of vessel.)
United States, official number.........., for the purpose of transmitting to and receiving from other ship stations and land stations general public correspondence, Government and service correspondence, and distress signals and messages, at rates of compensation not in excess of those fixed by the International Agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the scheule hereinafter.

2. The use or operation of apparatus for radio communication pursuant to this licence shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President " to the end that the same and ever article and clause thereof may be observed and fulfilled with good faith by the United States and citizens thereof," and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States.

3. The authority conferred by this licence is subject to the provisions of the act of February 4th, 1887, entitled "An Act to Regulate

Commerce," as amended by the Act of June 18th, 1910, so far as the licensee may be within the operation of said Act, and except as provided in the Act of August 13th, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

4. The licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations, and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the licensee under such accounts.

5. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, except when in case of emergency the Collector of Customs by authority of the Secretary of Commerce shall issue a temporary permit, in lieu of a licence, to the operator. The operator of the apparatus shall not wilfully or maliciously interfere with any other radio communication.

6. The stations shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress shall refrain from sending until all signals and radiograms relating thereto are completed.

7. The station shall be prepared to send the international signal of distress and distress signals on the normal wave length designated by the International Radiotelegraphic Convention in force with sufficient power to enable them to be received by day over sea a distance of 100 nautical miles by a ship station equipped with apparatus for sending and receiving equal in all essential particulars to the apparatus of the station herein licensed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall exchange radiograms with any other ship station without distinction of the radio systems adopted by such stations.

10. The station shall not use, except for sending signals of distress or signals and radiograms relating thereto, or when, owing to unusual circumstances, communication can be established only by means of an increase of power, a transformer input exceeding 1 kw., or exceeding ½ kw. when within five nautical miles of a naval or military station.

11. The President of the United States in time of war or public peril or disaster is authorised by law to close the station and cause the removal therefrom of all radio apparatus, or may authorise the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

12. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorised by him may at all reasonable times enter upon the station for the purpose of inspecting, and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

13. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

SCHEDULE OF STATION AND APPPARATUS.

Ship: Name, ...; Owner, ...; Home port, ...; International code letters, ...

Radio call letters: ....

Nature of service: ....

Hours of operation: ....

Power: Transformer input, ... kw.
Primary source of power, ...

Normal day range in nautical miles with other ships at sea, ...

Ship charge: Per word, ...; Minimum per radiogram ....
Per word ....; Minimum per radiogram..............

Radiotelegraphic system employed: ....
Characteristics of transmitting system:
Type of spark gap, ...
Approximate spark frequency, ...
....
Characteristics of receiving system:
Type of receiver, ...
Wave length range of receiving system: From .... metres to .... metres
....

Antenna: Number of masts, ...;
Height, ..., ..., ..., ...
Type of aerial ....
Wires: Number, ...; Size and kind, ...
Essential dimensions, ...
....

Auxiliary apparatus: Type, ...
Power: Source, ...; Normal day range with ships, ...

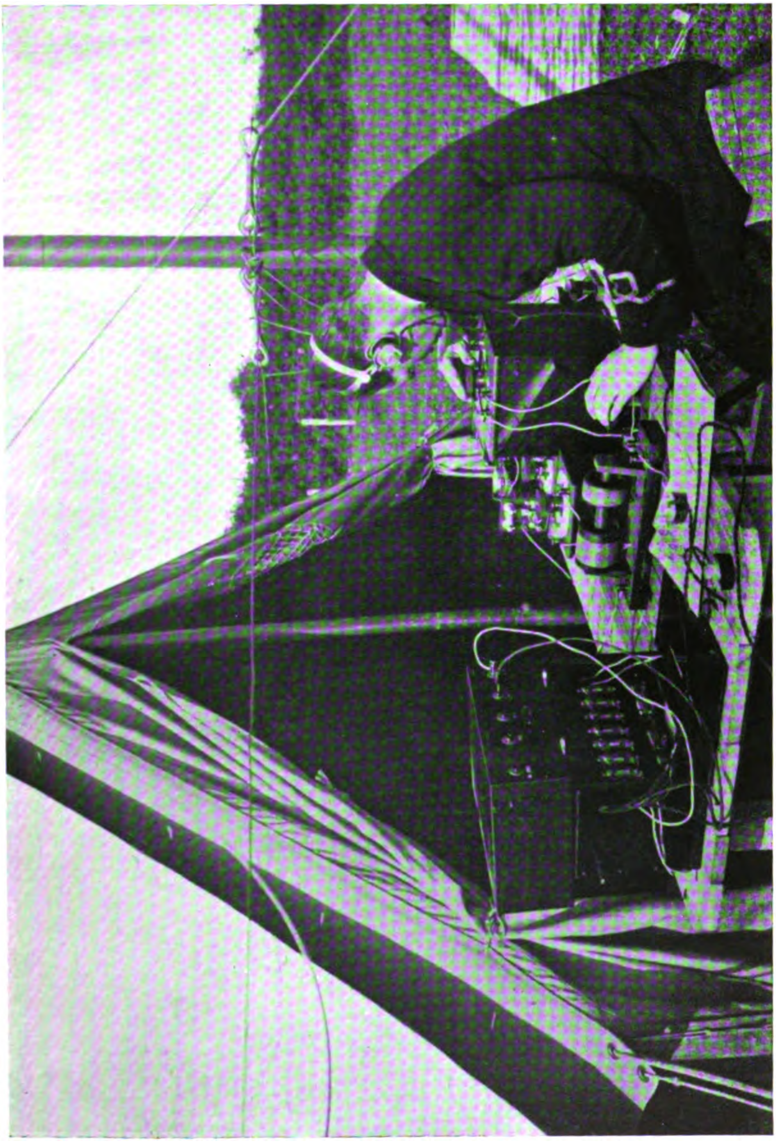
WAVE LENGTHS.

The normal sending and receiving wave length shall be 600 metres, and the station shall be prepared to use two sending wave lengths, one of 600 metres and one of 300 metres, as required by the International Radiotelegraphic Convention in force; and tuning positions shall be plainly marked: Provided, That the Secretary of Commerce may, in his discretion, change the limit of wave length reservations to accord with any international agreement to which the United States is a party.

A wave length of .... metres and the following additional wave lengths not exceeding 600 metres may be employed as authorised by law and treaty:

Metres, ...; Metres, ...; Metres, ...; Metres, ...; Metres, ...

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave-meter, shall not in any one of the lesser waves exceed 10 per cent. of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress and in sending distress signals when the transmitter may be tuned to create a maximum of interference with a maximum of radiation.



MARCONI WIRELESS DIRECTION FINDING APPARATUS IN OPERATION.

[*To face page* 432

Sending wave length.*	Antenna current (amperes).	Logarithmic decrement.	Reading of wave meter indicating instrument.†	
			Principal wave.	Wave next in energy.
600 metres				
300 metres				
metres				
metres				
metres				
metres				

* Under score normal.
† Type of indicating instrument, ...

The station in general shall transmit its radiograms to the nearest coast station. The sender shall have the right, however, to designate the coast station through which he desires to have his radiograms transmitted, and his wishes shall be complied with only if the transmission can be effected without interfering with the service of other stations, or the shipboard station shall wait until such coast station shall be the nearest as provided by the International Convention in force.

Satisfactory proof has been furnished that the station was actually operating August 13th, 1912.

This license will expire on the .... day of............191..

....
[SEAL.] *Secretary of Commerce.*

....
Commissioner of Navigation.
Washington, D.C.,............191..

INSPECTIONS.

Date.	Inspector.	Remarks.

No.......

LICENCE FOR LAND RADIO STATION.

Class..........

DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.
RADIO SERVICE.

J Pursuant to the Act to regulate radio communication, approved August 13th, 1912,.................. a citizen of the State of............... a company incorporated under the laws of the State of..............., having applied therefor, is hereby granted by the Secretary of Commerce for a period of................ on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this licence to use or operate the apparatus for radio communication (identified in the schedule hereinafter) for the purpose of transmitting to and receiving from ship stations and other land stations public correspondence, Government and service correspondence, and distress signals and messages at rates of compensation not in excess of those fixed by the international agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the schedule hereinafter, or for the purpose of conducting experiments for the development of the science of radio communication or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations, the purpose of the station being designated by the classification at the head of this licence.

2. Public correspondence or limited commercial correspondence authorised by this licence shall be limited to certain stations, ships or lines of ships named hereinafter, which designation is authorised in view of the nature of the service and is independent of the radio system employed.

3. The use or operation of apparatus for radio communication pursuant to this licence shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent Acts and treaties of the United States, in so far as they apply to the class of station indicated by this licence.

4. The authority conferred by this licence is subject to the provisions of the Act of February 4th, 1887, entitled "An Act to Regulate Commerce," as amended by the Act of June 18th, 1910, so far as the licensee may be within the operation of said Act, and except as provided in the Act of August 13th, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

5. The licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations, and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the licensee under such accounts.

6. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not wilfully or maliciously interfere with any other radio communication.

7. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall not use a transmitter during the first fifteen minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Regulation 12 of the Act of August 13th, 1912.

10. The President of the United States in time of war or public peril or disaster is authorised by law to close the station and cause the removal therefrom of all radio apparatus, or may authorise the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

11. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorised by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

12. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

SCHEDULE OF STATION AND APPARATUS.

Name of owner........................
Location: State, ...; County, ...; City or town,...... ....; Street, ...;
No. ....
....
....
Geographical location: Latitude, N...°..′..″; Longitude, W. ..°..′..″
This station is licensed for communication only with the following land stations, ships, or lines of ships:
....
....
....
....
Specific hours during which the station must/may be open to service (local standard time):......................
....
Power: Transformer input, ...kw.
Normal day range in nautical miles, ...
Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:
....
....
Call letters, ...
............; Coast charges: per word....; minimum per radiogram........
............; Coast charges: per word....; minimum per radiogram............
............; Coast charges: per word....; minimum per radiogram............
Radiotelegraphic system employed, ...
Characteristics of transmissing system:
Type of spark gap,....................
Approximate spark frequency,..........
....
Wave length range of receiving system: From.... metres to .... metres.
Antenna: Number of masts,...............
Height ......, ..., ..., ...
Type of aerial,...........................
Wires: Number, ...; Size and kind, ...
Essential dimensions,.................
....
....

WAVE LENGTHS.

The normal sending and receiving wave length shall be .... metres.

If the station be classified as a coast station, it shall be prepared to transmit or relay distress calls or messages using the distress wave length as provided by the International Radiotelegraphic Convention in force.

In view of special conditions the station is authorised to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,600 metres:
Metres,......; Metres,......; Metres,......; Metres,......

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave-metre, shall not in any one of the lesser waves exceed 10 per cent. of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

Sending wave-length.	Antenna current (amperes).	Logarithmic decrement.	Reading of wave metre indicating instrument.*	
			Principal wave.	Wave next in energy.
300 metres				
600 metres				
metres				
metres				
metres				
metres				

* Type of indicating instrument ....

The station insures rapid exchange with land wire stations at

....

(Company.)

....

(Location telegraph office.)

....

(Company.)

....

(Location telegraph office.)

in the following manner : ....

....

Satisfactory proof has been furnished that the station was actually operating August 13th, 1912.

This licence will expire on the............ day of............, 191..

[SEAL OF DEPARTMENT OF COMMERCE.]

....................,
Secretary of Commerce.
Commissioner of Navigation.
Washington, D.C., ...191..

INSPECTIONS.

Date.	Inspector.	Remarks.

LICENCE FOR (General or restricted.) AMATEUR RADIO STATION.

DEPARTMENT OF COMMERCE.

BUREAU OF NAVIGATION.

RADIO SERVICE.

K Pursuant to the act to regulate radio communication, approved August 13th, 1912, ..., a citizen of the State of ...., having applied therefor, is hereby granted by the Secretary of Commerce, for a period of .... year.., on and subject to the restrictions and conditions* hereinafter stated and revocable for cause by him, this Licence to use or operate the apparatus for radio communication (identified in the Schedule hereinafter) for the purpose of transmitting private radiograms or signals, notwithstanding the effect thereof extends beyond the jurisdiction of the State or Territory in which the said station is located : *Provided*, That no interference other than may result under the restrictions contained in this Licence shall be caused with the radio communication of stations of the Government of the United States or licenced stations.

2. The use or operation of apparatus for radio communication pursuant to this Licence shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States.

3. The apparatus shall at all times while in use and operation be in charge of a person or persons licenced for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not wilfully or maliciously interfere with any other radio communication.

4. The station shall give absolute priority to signals or radiograms relating to ships in distress ; shall cease all sending on hearing a distress signal ; and shall refrain from sending until all the signals and radiograms relating thereto are completed.

5. The station shall use the minimum amount of energy necessary to carry out any communication desired, and the transformer imput shall not exceed $\frac{\text{one}}{\text{one-half}}$ kilowatt.*

6. The station shall not use a transmitting wave length exceeding 200 metres.

7. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, whenever the Secretary of Commerce by noti e in writing shall require it to observe a division of the time, pursuant to the Twelfth Regulation of the Act of August 13th, 1912.

8. The President of the United States in time of war or public peril or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus, or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

9. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

10. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following Schedule except with the approval of a radio inspector or other duly authorized officer of the Government.

SCHEDULE OF STATIONS AND APPARATUS.

Name of owner, ... Age,....
Location : State,.........................
........................; County, ...
City or town, ... · Street, ...
No.......... Official call, ...
Name of naval or military station, if within five nautical miles, ...
....
Power : Transformer input, ..., W.†
Antenna : Type (T, ꓶ, fan, umbrella, etc.),
....
Height, ...;
Horizontal length, ...
(Above ground.)
Wires : Number in vertical part, ...
In horizontal part, ...

The normal sending and receiving wave length shall be .... metres and the (Not exceeding 200.) station is authorized to use the following additional wave lengths, not exceeding 200 metres : .... metres, ...metres.

Satisfactory proof has been furnished that the station was actually operating August 13, 1912.

This Licence expires on ...., 191..

EDWIN F. SWEET,
Assistant Secretary of Commerce.

E. T. CHAMBERLAIN
Commissioner of Navigation.

Delivered by ....
(Radio inspector.)
Place, ...
Date, ..., 191.. No.....

* Strike out "one" if the station be within five nautical miles of a naval or military station ; otherwise strike out "one-half."

† Not to exceed 1,000 ; or if the station be within five nautical miles of a naval or military station, not to exceed 500.

THE UNITED STATES OF AMERICA.
DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.

LICENCE TO RADIO OPERATOR,
COMMERCIAL EXTRA FIRST GRADE.

L This is to certify that .... has been examined and passed, pursuant to the Radiotelegraphic Convention, in

(*a*) adjustment, operation and care of apparatus;

(*b*) transmitting and sound reading at a speed of................words a minute, Continental Morse, and ....words a minute, American Morse;

(*c*) use and care of storage battery or other auxiliary;

(*d*) knowledge of international regulations and Acts of Congress to regulate radio communication;

(*e*) knowledge of United States Naval Radio Regulations;

and is hereby licenced, as required by law, a Radio Operator, Commercial Extra First Grade, for two years.

In testimony of trustworthiness and efficient service as Radio Operator for .... months, of which .... months were service at sea, and of superior knowledge and skill, ascertained by special examination this extra grade licence is granted.

.... Oath of Secrecy executed.
(Examining Officer.)

....
Secretary of Commerce.

....
Title *Notary Public.*

....
Commissioner of Navigation.

Place............ Date............ 191

No. ....

THE UNITED STATES OF AMERICA.
DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.

LICENCE TO RADIO OPERATOR,
COMMERCIAL* GRADE.

M This is to certify that .... has been examined and passed, pursuant to the Radiotelegraphic Convention, in

(*a*) adjustment, operation and care of apparatus;

(*b*) transmitting and sound reading at a speed of not less than† ...... words a minute, Continental Morse;

(*c*) use and care of storage battery or other auxiliary;

(*d*) knowledge of international regulations and Acts of Congress to regulate radio communication;

and is hereby licensed as required by law a Radio Operator, Commercial *...... grade for two years. The candidate's practical knowledge of adjustment was tested on a .... set of apparatus. His knowledge of other systems is shown below.

....
....
....

WILLIAM C. REDFIELD,
Secretary of Commerce.

.... Oath of Secrecy executed.
(Examining Officer.)

E. T. CHAMBERLAIN,
Commissioner of Navigation.

....
(Title) *Notary Public.*

Place .... Date .... 191..

No. ....

THE UNITED STATES OF AMERICA
DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.

LICENSE TO RADIO OPERATOR,
AMATEUR FIRST GRADE.

N This is to certify that .... has been examined and shown to have a knowledge of the adjustment and operation and of the regulations of the Radio telegraphic Convention and the Acts of Congress in so far as they relate to interference with radio communication and impose certain duties on all grades of operators sufficient to entitle him to a licence, and he is hereby licenced as required by law Radio Operator, Amateur First Grade for two years.

The candidate was examined and shown to have knowledge (excellent or good) in the following additional subjects:

(*a*) general adjustment, operation and care of apparatus ‡..................;

(*b*) transmitting and sound reading Continental Morse at a speed of §.......... words a minute;

(*c*) general knowledge of international regulations and Acts of Congress to regulate radio communication ‡..................

.... Oath of Secrecy executed.
(Examining Officer.)

....
(Title.) *Notary Public.*

Place ...., Date.......... 19....

WILLIAM C. REDFIELD,
Secretary of Commerce.
E. T. CHAMBERLAIN,
Commissioner of Navigation.

No. ....

THE UNITED STATES OF AMERICA.
DEPARTMENT OF COMMERCE.
BUREAU OF NAVIGATION.
RADIO SERVICE.

LICENCE TO RADIO OPERATOR,
AMATEUR SECOND GRADE.

O This is to certify that .... has presented satisfactory evidence that he has a knowledge of the adjustment and operation of apparatus and of the regulations of the Radiotelegraphic Convention and the Acts of Congress, in so far as they relate to interference with radio communication and impose certain duties on all grades of operators, sufficient to entitle him to a licence, and he is hereby temporarily licensed as RADIO OPERATOR, AMATEUR SECOND GRADE, for the period of eight months or until he has been duly examined.

He has shown that he has knowledge (excellent or good) of the following additional subjects:

(*a*) General adjustment, operation, and care of apparatus ....
(Excellent or good.)

(*b*) Transmitting and sound reading Continental Morse at a speed of .... words a minute.

(*c*) General knowledge of international regulations and Acts of Congress to regulate radio communication ....
(Excellent or good.)

* First or Second.
† Twenty or Twelve.
‡ Excellent or good.
§ Insert speed.

.... Oath of secrecy executed:
(Certifying Officer.)

....
(Title.) *Notary Public.*
Place, ... Date, ..., 191..

WILLIAM C. REDFIELD,
Secretary of Commerce.
E. T. CHAMBERLAIN,
Commissioner of Navigation.

Operators' licences are not valid until the following oath has been executed on the backs of the licences:—

I, ..., do solemnly swear that I will faithfully preserve the secrecy of all messages coming to my knowledge through my employment under this licence; that this obligation is taken freely, without mental reservation or purpose of evasion; and that I will well and faithfully discharge the duties of the office: So help me God.

....
(Signature of holder.)
Date of birth, ...
Place of birth, ...
Sworn to and subcribed before me this........
day of .... A.D., 191..

....
Notary Public.

SEAL.

SERVICE RECORD.

This is to certify that the holder of this licence has served satisfactorily as radio operator under my orders during the period named.

Name of Ship or Land Station.	Period.	Master, Manager, or Superintendent.
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....
....	From ...., 19.., to ...., 19..	....

Operators must have the service record on the backs of their licences properly completed and signed by the master of their ship or their employer.

NOTICE TO BERNE BUREAU.

P The Minister of Marine of the United States of America has notified to the Berne Bureau that the following information is to be published:—

1. The Departments of the United States Government which are concerned with wireless telegraphy regret that they have not yet been able to make arrangements with the land telegraph of the United States owing to the fact that these are in the hands of commercial companies, and have nothing to do with the Government. The idea was to arrange for the free transmission over the land telegraph, in accordance with Article 14, paragraph 2, of the Rules of Service of the London Convention. The information to be transmitted free of charge was all such as related to the date and the hour of the handing in of radiotelegrams on board ship. But the transmission of such information over land lines being subject to a tax, the Government of the United States cannot, at present, conform strictly to this rule of the Convention. The declaration of the American delegation contained in Article 2 of the Final Protocol made provision for such a possible outcome, although its exact nature was not actually set forth.

2. Multiple radiotelegrams, such as are mentioned in Article 38, paragraph 5, of the Rules of Service, will be accepted as multiple messages in all wireless transmission between ship and shore stations, but all the companies operating land telegraph lines in the United States will consider, and will charge for, a multiple wireless message as consisting of so many individual telegrams as the addresses it bears may indicate.

3. The United States is not a member of the International Telegraphic Union and consequently is not bound to execute the rules laid down in Article 38, paragraph 8, of the London Convention Rules of Service concerning urgent radiotelegrams. The laws of the United States regulating all reciprocal arrangements between the States forbid the use of the privilege, and consequently all telegraph companies will not allow any priority in favour of telegrams for which any additional tax may have been paid.

Q An Act to authorise the President of the United States to arrange and participate in an international conference to consider questions relating to international communication.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States be, and he is hereby, requested and authorised in the name of the Government of the United States to call, in his discretion, an international conference to assemble in Washington, and to appoint, by and with the advice and consent of the Senate, representatives to participate therein, to consider all international aspects of communication by telegraph, telephone, cable, wireless telephone, and wireless telegraphy, and to make recommendations with a view to providing the entire world with adequate facilities for international communication on a fair and equitable basis.

SEC. 2.—That the sum of $75,000, or so much thereof as may be necessary, is hereby appropriated out of any money in the Treasury not otherwise appropriated, the same to be disbursed under the direction and in the discretion of the Secretary of State for expenses incidental to the conference, including personal services in the District of Columbia notwithstanding the provisions of any other Act: Provided, That no part of said sum shall be used in entertainment or for the purchase of medals and badges.

Approved, December 17th, 1919.

URUGUAY

THE independence of the Republic of Uruguay, originally part of the Spanish Viceroyalty of Rio de la Plata, and later on a Province of Brazil, was declared on August 25th, 1825, and recognised by Treaty on August 27th, 1828. The constitution was sworn on July 18th, 1830. Legislation is administered by a Parliament of two Houses, the Executive being in the hands of a President elected every four years. The total area of the nineteen departments into which the country is divided is estimated at 72,153 square miles. The capital city is Montevideo, situated on the northern bank of the River Plate Estuary.

CONTROL.

Wireless telegraphy in Uruguay is controlled by the Government, the department in charge being the Ministry of War and Marine. The Government ship stations (comprising the cruisers *Uruguay* and *Monte Video*, the gunboat 18 *de Julio*, the transport *Baron de Rio Branco*, and the Government steamer *Oyarvide*) are also under the control of the Minister of War and Marine. There are no privately owned stations. There are no radiotelegraphic clubs or societies, in fact wireless telegraphy is entirely a Government monopoly.

ORGANISATION.

The installation of wireless telegraphy in Uruguay was authorised by a Government Decree dated June 22nd, 1910. This decree provided for one long-distance station at Montevideo, minimum range 500 miles; two situated respectively at Paso de los Toros and Rivera (Northern Frontier) with minimum range of 372 miles; two respectively situated at Lobos Island and the English Bank, each with minimum range of five miles; besides installations on the various Government vessels. By the end of the year 1911 the service (supplemented by two Military Field Stations) was in working order.

The Montevideo station, opened to the public in December, 1911, and standing on a hill three miles from the river, is the only installation doing international work. Its location is called Cerrito de la Victoria, and the wireless station generally goes by the name of "Cerrito." The installations situated at Rivera and Paso de los Toros are employed solely for military purposes, and only in times of crisis, should a breakdown of the ordinary wired service eventuate, are then used for public messages.

OFFICIALS CONTROLLING WIRELESS TELEGRAPH OPERATIONS.

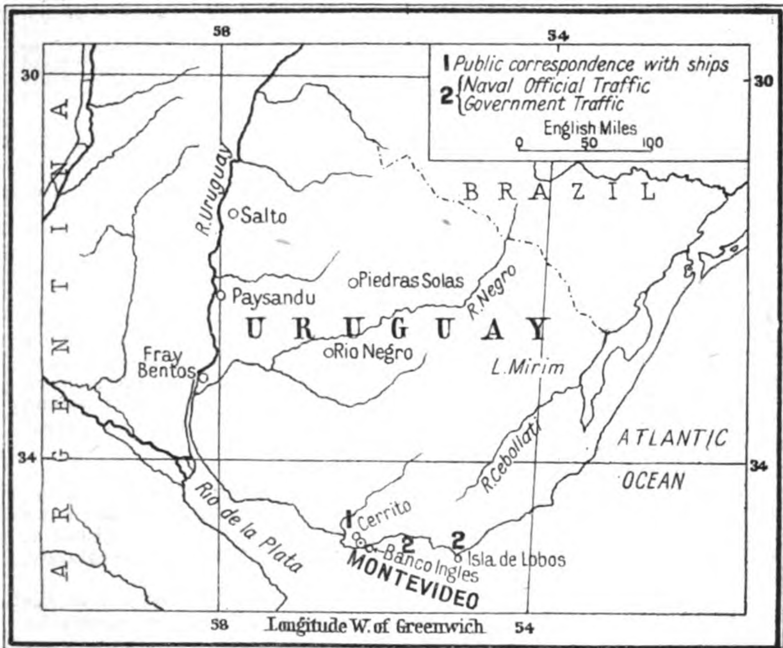
Official.	*Title.*	*Address.*
Dr. Arturo Gaye ..	Acting *pro tem.* as Minister for War	Montevideo
Bernardo Kayel ..	Engineer Inspector-General ..	Calle Pereira 74, Montevideo
Juan P. Camera ..	Secretary	Calle Ituzaingo 1278, Montevideo
Lieut.-Col. Carlos Du Pre	Chief of Montevideo Station (Cerrito)	Montevideo
Cesar Vidal y Pineiro	Chief of Paso de los Toros Station	Paso de los Toros
Gualberto Oriel ..	Chief of Rivera Station	Rivera

ADMINISTRATION.

The first decree regulating the subject was issued by the Ministry of War and Marine on September 5th, 1911, and was followed by a decree dated January, 1912. Under its provisions *all ships calling at the ports of the Republic and destined for Passenger Service are obliged to be fitted with wireless apparatus.*

We print here the text of both the decrees above referred to:—

A—Decree of September 5th, 1911.
B—Decree of January, 1912.



DECREE OF SEPTEMBER 5TH, 1911.

A

1. The National Wireless Telegraphy Office is under the direct control of the Ministry of War and Marine, with the Engineer Inspector-General as its head.

2. The National Wireless Telegraphy Office is in charge of and controls all the radiotelegraphic stations, whether fixed or military movable ones, on vessels or on lighthouses, together with their staff, apparatus and installations.

3. The Inspector-General will at such times and under such circumstances as he thinks proper make visits of inspection of the stations in order to take personal cognisance of their requirements, and he exercises in regard to the staff, whether military or civil, the character of a staff commander.

4. On the occasions of manœuvres the Inspector-General will designate the country stations which are to take part in accordance with the instructions he receives as to the requirements of the occasion.

5. It is one of the duties of the National Wireless Telegraph Office to propose to the superior department the construction of fresh stations and to report regarding the means for acquiring the same.

6. The Inspector-General controls the sums received for transmission of telegrams, which sums shall be deposited in the Bank of the Republic to the order of the Minister of War and Marine.

7. The National Wireless Telegraph Office will make contracts with the General Post and Telegraph Office and with the shipping companies to be submitted for approval to the Minister of War and Marine; similarly the office is empowered to draw up with the administrations of the neighbouring States radiotelegraphic agreements with the object of improving and amplifying the international wireless telegraph service, all of which shall be submitted for approval by the higher department.

8. The Minister of War and Marine will notify the International Office in Berne of the creation of the National Wireless Telegraph Office in Uruguay, so that in future all questions concerning wireless telegraphy in Uruguay may be referred direct to it.

9. The Inspector-General will report quarterly to the Minister of War and Marine regarding the general conditions and working of the service under his charge, and will compile an annual memorandum upon the general work of his department.

DECREE OF JANUARY, 1912.

B

1. Commencing from May 1st of the present year (1912) all the ships carrying passengers between the harbours of the Republic and those of foreign countries shall be fitted with radiotelegraph installations.

2. The said installations shall be designed to receive and transmit telegrams up to a distance of not less than one hundred kilometres on the ships of river navigation, and four hundred kilometres on those of the oceanic navigation.

3. The installations shall be permanently kept in good conditions of working, and capable of intercommunicating with the stations of the Republic.

4. The stations shall be in charge of persons well acquainted with the use of radiotelegraph apparatus.

5. The service of the stations shall be entirely in accordance with the provisions of the International Radiotelegraph Convention.

6. The agents of the companies will inform, before expiration of the time fixed, the General Inspector of the National Service of Wireless Telegraphy of the characteristics, system, power, etc., of the radiotelegraph apparatus to be fitted on the ships of their companies.

7. The ships which after expiration of the time fixed by Article 1 have not complied with the provisions of this Decree shall not be authorised to carry passengers in the harbours of the Republic.

8. Those ships which do not keep their wireless apparatus in proper working conditions shall be liable to have applied to them the penalty specified in the previous article (7).

9. The General Inspector of the National Service of Wireless Telegraphy is hereby entrusted with seeing that the provisions of this Decree are duly complied with.

VENEZUELA

THE Republic of Venezuela was formed in 1830 by secession from the other members of the Republic of Colombia. The Constitution in force is that of June 13th, 1914. Legislative authority is vested in a Congress of two Chambers, whilst the Executive Power is exercised by a President in conjunction with Cabinet Ministers. The twenty states, two territories and one Federal district of which it is composed cover an area of 398,594 square miles.

CONTROL AND ORGANISATION.

Wireless telegraphy has not yet been established as a public service. Trials have been made by individuals, but no permanent installation for public use exists. A small installation for students has been established at Puerto Cabello for the use of a Government School of Wireless Telegraphy, established in June, 1917.

Dr. Luis Soriano, former Director of the Physical Laboratory at the Central University, was the first to make experiments with wireless telegraphy in Venezuela.

Wireless telegraphy is under jurisdiction of the Central Government.

Private concerns are not allowed to erect or work wireless. The Government could at any time grant licences for the establishment of a wireless service by private companies or individuals.

The Government is bound by a contract with the "Compagnie Française des Cables Télégraphiques," a French concern, to give to that company a preference, in equal circumstances, in any concession for wireless communication with foreign countries.



As regards communication within the country, the right to establish public wireless communication is comprised in the State monopoly for any kind of telegraph communication, as indicated in the extract from the Laws relating to Telegraphs and Telephones printed here.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Dr. Gumersindo Torres ..	Minister of Fomento	Caracas.
Dr. C. Gimenez Rebolledo ..	Minister of War	Caracas.
Grl. Tobias Uribe	Director of Telegraphs	Caracas.
Dr. S. Key Ayala	Director of Posts and Telegraphs at the Ministry of Fomento	Caracas.

There are no companies manufacturing wireless apparatus or engaged in wireless business of any kind in Venezuela.

There are no wireless societies, clubs, or publications in the country.

ADMINISTRATION.

The general subject of telegraphs and telephones is regulated under a law dated June 8th, 1918, and published in the *Gaceta Oficial*, the official organ of the Federal Government.

For the reason that, as stated above, there are no wireless telegraph stations in Venezuela working regular traffic, no specific reference is made to radiotelegraphy in the Law; but it is covered under Article 1, which reserves wireless as a State monopoly. That article runs as follows:—

"The National Government of Venezuela reserve for themselves the exclusive right to establish in the country any system already invented of telegraph and telephonic communication, and it deputes to the Ministry of Fomento the management of such systems."

The rest of the Law refers exclusively to the conditions upon which the Government may allow railway companies and certain other public corporations to establish private lines of telegraphs and telephones.

VIRGIN ISLANDS

(See LEEWARD ISLANDS.)

WEIHAIWEI

(See CHINA (FOREIGN SETTLEMENTS).)

ZANZIBAR

THE island of Zanzibar, covering an area of 640 square miles, lies in 6° south latitude, and is separated from the mainland by a channel 22½ miles across at its narrowest part. It was not until during the sixteenth century that the Arabs of the East Coast succeeded in driving out the Portuguese, and the island was then attached (more or less nominally) to the rulers of Muscat. The supremacy of British interests in the island was recognised by other European States in 1890, Great Britain waiving all claims to Madagascar in favour of France, and ceding Heligoland to Germany.

The ruler of Zanzibar is a native Sultan; but the administration is conducted by a British High Commissioner and Resident.

CONTROL.

OFFICIALS CONTROLLING WIRELESS TELEGRAPHY.

Official.	*Title.*	*Address.*
Mr. R. Withycombe, M.B.E...	Director of Railway and Electricity	Zanzibar
Mr. S. W. Dyer	Assistant Director of Railway and Electricity ..	Zanzibar

ORGANISATION.

The Government maintains wireless stations in Zanzibar, Pemba, and Mafia.

ADMINISTRATION.

We append herewith the Decree issued by the Sultan in 1909 in regard to wireless.

WIRELESS TELEGRAPHY DECREE.
No. 6 of 1909.

In the Name of the Most Merciful God.

It is hereby declared as follows :—

1. (1) No person shall establish any wireless telegraph station or instal any apparatus for wireless telegraphy in any place in our dominions except under and in accordance with a licence granted in that behalf by our First Minister.

(2) Every such licence shall be in such form and for such period as our First Minister may determine, and shall contain the terms, conditions and restrictions on and subject to which licence is granted, and any such licence may include two or more stations or places.

(3) If any person establishes a wireless telegraph station without a licence in that behalf or instals or works any apparatus for wireless telegraphy without a licence in that behalf, he shall be guilty of an offence against this Decree, and on conviction he shall be liable to a fine not exceeding 1,500 rupees, or to simple imprisonment for a term not exceeding twelve months, or to both, and in either case be liable to forfeit any apparatus for wireless telegraphy installed or worked without a licence, but no proceedings shall be taken against any person under this Decree except by the order of our First Minister.

(4) If the Court is satisfied by information on oath that there is reasonable ground for supposing that a wireless telegraph station has been established without a licence in that behalf, or that any apparatus for wireless telegraphy has been installed or worked in any place or on board any ship within its jurisdiction without a licence in that behalf, it may grant a warrant to any officer of our police to enter and inspect the station or place or ship, and to seize any apparatus which appears to him to be used, or intended to be used, for wireless telegraphy therein.

(5) Our First Minister may make regulations for prescribing the form and manner in which applications for licences under this Decree are to be made and fees payable on the grant of any such licence.

2. Where the applicant for a licence proves to the satisfaction of our First Minister that the sole object of obtaining the licence is to enable him to conduct experiments in wireless telegraphy, a licence for that purpose shall be granted, subject to such special terms, conditions, and restrictions as our First Minister may think proper, but shall not be subject to any rent or royalty.

3. No person shall work any apparatus for wireless telegraphy installed on any ship whilst that ship is in the waters of our dominions otherwise than in accordance with regulations made in that behalf by our First Minister, and our First Minister may by any such regulations impose penalties for the breach of any such regulations not exceeding 150 rupees for each offence, and may provide for the forfeiture on any such breach of any apparatus for wireless telegraphy installed or worked on such ship. Save as aforesaid, nothing in this Decree shall apply to the working of apparatus for wireless telegraphy installed on any foreign ship.

4. The term "ship" includes steamers, sailing ships, dhows, lighters, rafts, and every other form of boat. The expression "wireless telegraphy" means any system of communication by telegraph as defined in "The Indian Telegraph Act, 1883" without the aid of any wire connecting the points from and at which the messages or other communications are sent and received.

Provided that nothing in this Decree shall prevent any person from making or using electrical apparatus for actuating machinery or for any purpose other than the transmission of messages.

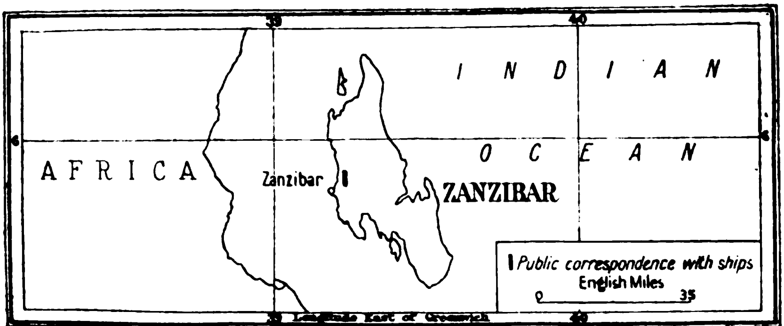
5. This Decree may be cited as "The Wireless Telegraphy Decree, 1909."

Given under our hand and seal this 9th day of February, 1909.

ALI-BIN-HAMOUD.

Countersigned under the provisions of Article 47 of "The Zanzibar Order in Council, 1906."

JOHN H. SINCLAIR,
British Agent and Consul-General.



DIRECTORY OF THE WORLD'S WIRELESS STATIONS

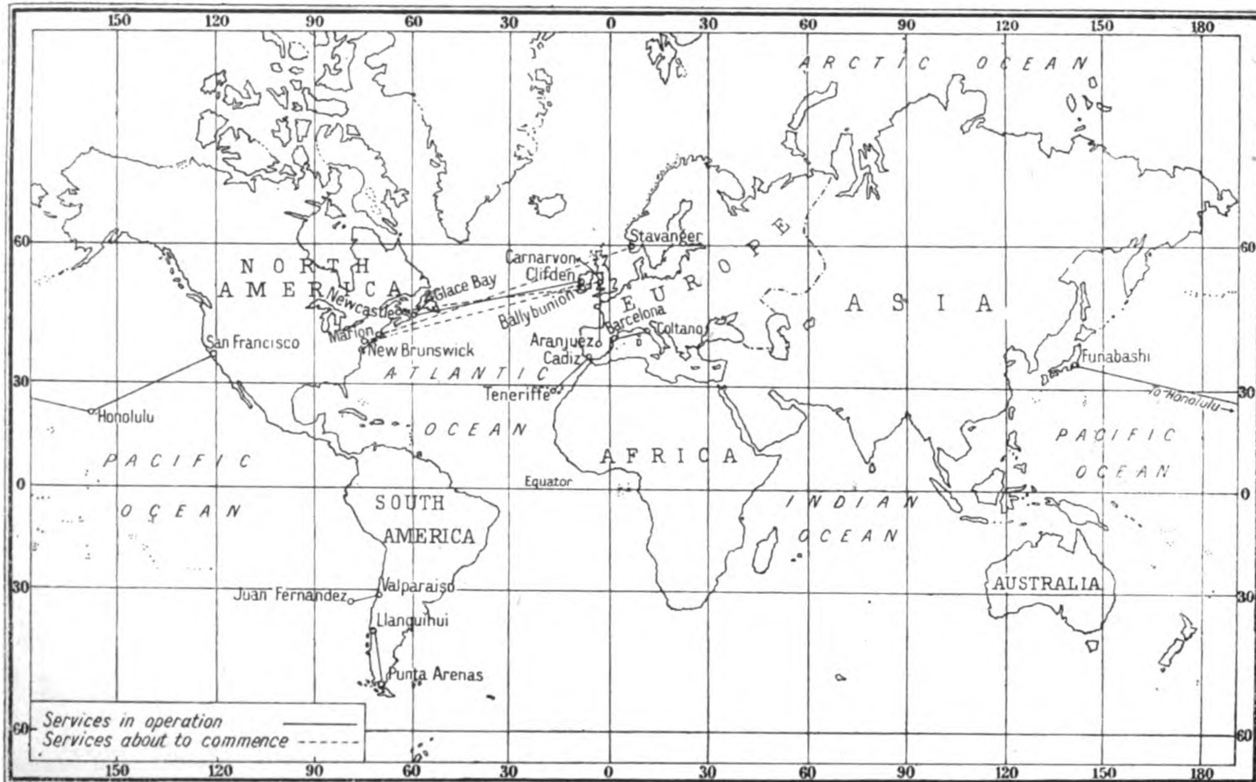
(A) Land Stations.

(B) Shipboard Stations.

(C) International Call Letters.

(D) Alphabetical List of Wireless Stations.

THE WORLD'S WIRELESS COMMERCIAL SERVICES



WIRELESS TELEGRAPH STATIONS OF THE WORLD

A. Land Stations
B. Ship Stations

THE tables of land stations set out in the following pages should be consulted in conjunction with the maps showing the position of wireless telegraph stations inserted in the Laws and Regulations Section (see pp. 77 to 442). The stations have been grouped together under the names of the countries in which they are situated, and these countries have been arranged in alphabetical order; therefore no difficulty is likely to be experienced in locating any particular station.

The International Bureau has allotted to signatories of the Convention a list of combinations of letters to be used as call signals for stations proper to the respective countries. The letter limitations of these lists are shown on page 759 together with the names of the countries with which they are connected.

An alphabetical list of call letters for land and ship stations appears on pages 760 to 828. This list indicates upon which page particulars of any station may be found.

Stations of a private or experimental character are omitted, unless exceptional circumstances warrant their inclusion.

Every effort has been made to attain the maximum degree of accuracy possible in these lists, but no responsibility can be accepted, however, in this connection.

A. LAND STATIONS

The following abbreviations are used in the Table of Land Stations below:—Column 2 (Geographical Position): E—East Longitude; W—West Longitude; N—North Latitude; S—South Latitude. Column 7 (Nature of Service): P G—General Public Correspondence; P R—Restricted Public Correspondence; O—Official Correspondence; P—Private Correspondence; D F—Direction Finding Service. Column 8 (Hours of Service): N—Continuous Service; X—No fixed working hours.

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
ABYSSINIA										
Gambela	—	—	—	Sudan Government	—	—	—	—	—	
ADEN										
Aden	12° 46′ 00″ N. 45° 02′ 00″ E.	BZF	1,000	British Admiralty	**600**[1]-2,000 (spark) 4,000, 4,200 4,500 (arc)	P G, O..	N	0.60	—	[1] Other wave-lengths are used for official correspondence
Aden Radio	12° 46′ 00″ N. 45° 03′ 00″ E.	VPI	250	Government ..	**600**	P G[2] ..	N	0.60	—	[2] The station also exchanges public and official correspondence with Berbera Radio (Brit. Somaliland)
ADMIRALTY ISLAND										
Manus	2° 14′ 00″ S. 146° 34′ 00″ E.	VZO	—	Australian Government	300, **600**	P G ..	—	0.30[1] 0.60[2]	— —	[1] For radiotelegrams exchanged with ships subject to the administration of Australia or of New Zealand [2] For radiotelegrams exchanged with ships other than those subject to the administration of Australia or of New Zealand
ALASKA										
Akutan	Aleutian Islands 54° 08′ 00″ N. 165° 48′ 00″ W.	KMW	50	North Pacific Sea Products Co.	300, 525, **600**	P[1] ..	X	—	—	[1] Only exchanges correspondence with fixed stations
Alitak, Alaska ..	—	KYL	—	Alaska Packers Association	300, 550, **600**	P ..	X	—	—	[2] Interior station
Atka, Alaska ..	—	WJI	—	Bureau of Education	300, 550, **600**, 1,650	P R ..	X	—	—	[3] Limited to correspondence with ships of the Alaska Steamship Co. and Pacific Coast Steamship Co.
Brooks, Alaska[2] ..	65° 00′ 00″ N. 149° 30′ 00″ W.	KIZ	300	Alaska Wireless Telegraph Co.	300, **600**	—[1]	0930 to 1000 1300 to 1330 1600 to 1630	—	—	[4] The station is opened approximately from April to October

Bristol Bay, Alaska ..	58° 45' 00" N. 158° 28' 00" W.	KMP	20	Alaska Packers Association	300, 500, **600**	—[1]	X	—	—
Cape Edwards, Alaska	—	KEY	—	Deep Sea Salmon Co.	—	—	—	—	—
Chicagof, Alaska ..	57° 36' 30" N. 136° 09' 20" W.	KWW	50	Joseph T. Bauer	300, 550, **600**	P[3] ..	X	—	—
Chignik	Alaska Peninsula 56° 17' 30" N. 158° 31' 30" W.	KHC	200	Alaska Packers Association	300, 500, **600**, 1,610	—[1]	X[4]	—	—
Circle City[2 8] ..	65° 49' 12" N. 144° 04' 18" W.	WVA	450	U.S. Army ..	300, **600**, 1,250	P G ..	—	—	—
Clark's Point ..	Bristol Bay 58° 50' 45" N. 158° 31' 30" W.	KHG	200	Alaska Packers Association	300, 500, **600**	P[5] ..	X[4]	—	—
Cordova, Alaska[9] ..	Prince William Sound 60° 27' 45" N. 145° 58' 55" W.	NPA	400	U.S. Navy ..	300, **600**	P G[6] ..	N	0.30[7]	—
Dutch Harbour[9] ..	Aleutian Islands, Unalaska 53° 53' 14" N. 166° 32' 08" W.	NPR	150	U.S. Navy ..	300, **600**	P G[6] ..	N	0.30[7]	—
Egegik ..	58° 17' 00" N. 157° 39' 00" W.	KMF	100–300	North Alaska Salmon Co.	300, 500, **600**	P[10] ..	X	—	—
Ekuk, Alaska ..	—	KMG	—	Libby, McNeill and Libby	300, 500, **600**	P ..	X	—	—
Fairbanks, Alaska[2 8]	64° 50' 17" N. 147° 42' 21" W.	WVB	200	U.S. Army ..	**600**, 1,400	P G ..	—	—	—
Fort Craig	—	WXO	—	U.S. Army ..	300, **600**	P G ..	—	—	—
Fort Egbert[2 8] ..	Eagle 64° 46' 19" N. 141° 13' 48" W.	WVC	200	U.S. Army ..	**600**, 1,400	P G ..	—	—	—
Fort Gibbon, Alaska[2 8]	Tanana 65° 10' 16" N. 152° 05' 21" W.	WVD	200	U.S. Army ..	**1,600**, 2,000	P G ..	—	—	—
Fort St. Michael[8] ..	St. Michael Island 63° 29' 15" N. 162° 00' 18" W.	WVE	220	U.S. Army ..	300, **600**, 900, 1,200	P G ..	Local time: 0900 to 2100	0.30	—
Fort Yukon, Alaska[8]	—	WXX	—	U.S. Army ..	300, **600**, 1,050	P G ..	—	—	—
Funter, Alaska ..	—	KXK	—	Thinket Packing Co.	—	—	—	—	—
Hawk Inlet, Alaska	—	KKAI	—	P. E. Harris and Co.	—	—	—	—	—
Holy Cross[8] ..	—	WVK	—	U.S. Army ..	300, **600**, 1,000	P G ..	Weekdays: 1100, 1500, 1800. Sundays and holidays: 1100, 1800	—	—
Iditarod[2]	62° 40' 00" N. 158° 00' 00" W.	KIV	200	Alaska Wireless Telegraph Co.	300, 500, **600**	P ..	X	—	—
Ikatan, Alaska ..	—	KXW	—	Pacific American Fish Co.	—	—	—	—	—

[5] Limited to correspondence with ships of the Alaska Packers Association

[6] Information of navigational importance is transmitted at 0800, 1200, 1600, and 2000. (For full particulars see International Time and Weather Signals)

[7] No charge is made for relaying messages

[8] Operated by the United States Signal Corps, War Dept., Washington

[9] Operated by the United States Naval Communication Service, Washington

[10] The station is limited to the correspondence with coast and ship stations of the North Alaska Salmon Co.

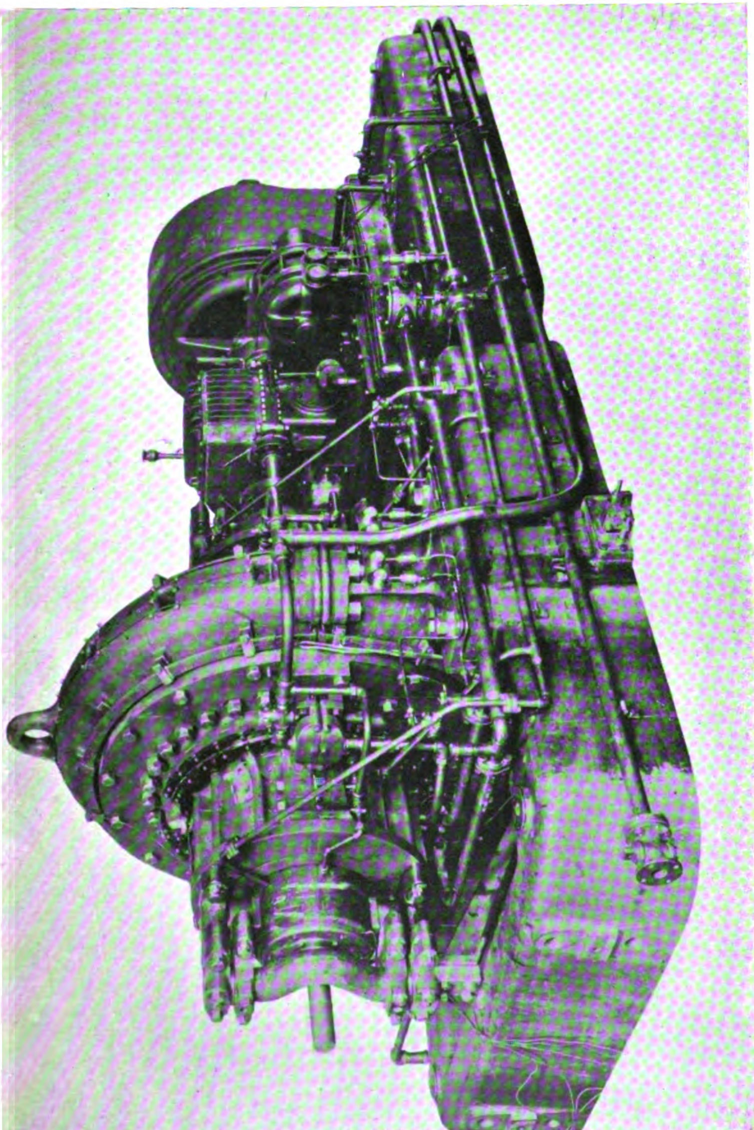
[11] Communicates with the stations of the Red Salmon Packing Co.

[12] This wave-length is used for inland correspondence

[13] Exchanges correspondence with Latouche, Ala-ka

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
ALASKA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Jualin	58° 56′ 00″ N. 135° 00′ 00″ W.	KJA	100	Jualin Alaska Mines Co. ..	300, 550, **600**, 1,900	P ..	X	—	—	
Juneau, Alaska* ..	58° 19′ 00″ N. 134° 25′ 00″ W.	NVD	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Karluk, Alaska ..	—	KYK	—	Alaska Packers Association	300, 550, **600**	P ..	X	—	—	
Ketchikan*	Alexander Archipelago 55° 20′ 45″ N. 131° 38′ 51″ W.	NVH	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
King Cove	Alaska Peninsula 55° 05′ 00″ N. 162° 20′ 00″ W.	KJK	200	Pacific - American Fisheries Co.	300, **600**	P G ..	N	0.30	—	
Kodiak	Hood Island 57° 46′ 42″ N. 152° 21′ 52″ W.	NPS	200	U.S. Navy ..	300, **600**	P G* ..	N	0.30	—	
Koggiung	Bristol Bay 58° 52′ 30″ N. 156° 55′ 30″ W.	KVV	250	Alaska Fishermen's Packing Co.	300, 450, **600**	P G ..	N	0.30	—	
Kussilof, Alaska ..	—	KKAO	—	Alaska Packers Association	—	—	—	—	—	
Kvichak, Alaska ..	59° 03′ 00″ N. 156° 48′ 00″ W.	KHB	125	Alaska Packers Association	300, 450, **600**	P ..	X	—	—	
Kwiguk Slough, Alaska	—	KOV	—	Carlisle Packing Co.	—	—	—	—	—	
Larsen Bay ..	Kodiak Island 57° 37′ 30″ N. 153° 59′ 40″ W.	KHA	200	Alaska Packers Association	300, 500, **600**	P ..	X	—	—	
Latouche, Alaska ..	—	KIM	150	Kennecott Copper Corporation	300, **600**	P G ..	N	0.30	—	
Lazy Bay	—	KEPS	—	Alitack Packing Co.	—	—	—	—	—	
Libbyville, Alaska ..	—	KMT	—	Libby, McNeill and Libby	300, **600**	P ..	X	—	—	
Lockanok, Alaska	59° 05′ 45″ N. 156° 37′ 50″ W.	KML	20–30	N rth Alaska Salmon Co.	300, 500, **600**	P ..	X	—	—	
McGrath, Alaska ..	—	KIF	—	Alaska Wireless Telegraph Co.	—	—	—	—	—	
Marshall, Alaska ..	—	KIS	—	Harry G. Watson	550, **1,600**	P ..	X	—	—	
Morzhovoi, Alaska ..	—	KJL	—	Sockeye Salmon Co.	300, 550, **600**	P ..	X	—	—	



200 K.W. ALEXANDERSON HIGH-FREQUENCY ALTERNATOR.

[*To face page* 448

Nakat Inlet, Alaska	—	KDW	—	G. W. Hume and Co.	300, 500, 600	P ..	X	—	—
Naknek KHT ..	Bristol Bay 58° 43′ 30″ N. 157° 00′ 00″ W.	KHT	200	Alaska Packers Association	300, 500, 600	P[5] ..	X	—	—
Naknek KMK ..	58° 43′ 20″ N. 156° 25′ 00″ W.	KMK	300	Nacknek Packing Co.	300, 500, 600	P[11] ..	X	—	—
Nelson Lagoon, Alaska	—	KXV	—	Pacific - American Fisheries Co.	300, 600	P ..	X	—	—
Nome, Alaska[8] ..	Norton Sound 64° 30′ 20″ N. 165° 23′ 38″ W.	WVG	260	U.S. Army ..	300, 600, 2,000[12]	P G ..	N	0.30	—
Nulato[2 8]	64° 43′ 30″ N. 158° 06′ 48″ W.	WVH	950	U.S. Army ..	300, 600, 1,500	P G ..	—	—	—
Nushagak	Bristol Bay 58° 42′ 00″ N. 158° 32′ 00″ W.	KKAE	100–300	Libby, McNeill and Libby	300, 600	P[10] ..	X	—	—
Petersburg, Alaska[8]	Alexander Archipelago 56° 48′ 44″ N. 133° 57′ 06″ W.	WVI	40	U.S. Army ..	300, 600	P G ..	—	0.30	—
Port Althorp, Alaska	—	KLW	—	Deep Sea Salmon Co.	—	—	—	—	—
Port Beauclaire ..	—	KWO	—	Beauclaire Packing Co.	—	—	—	—	—
Port Chatham ..	—	KWH	—	Alaska Ocean Food Co.	—	—	—	—	—
Port Moller	59° 50′ 00″ N. 160° 40′ 00″ W.	KWR	250	Pacific - American Fisheries	300, 450, 600	P ..	X	—	—
Port Walter ..	56° 20′ 00″ N. 134° 40′ 00″ W.	KEQ	100	Alaska Herring and Sardine Co.	300, 525, 600	P ..	X	—	—
St. George, Alaska[9]	Pribilof Islands 56° 36′ 00″ N. 169° 43′ 00″ W.	NPY	40	U.S. Navy ..	300, 600	P G[6] ..	N	0.30[7]	—
St. Paul, Alaska[9] ..	Pribilof Islands 57° 07′ 20″ N. 170° 16′ 20″ W.	NPQ	200	U.S. Navy ..	300, 600	P G[6] ..	N	0.30[7]	—
Seward, Alaska ..	—	NPV	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Sitka, Alaska[9] ..	Alexander Archipelago 57° 02′ 58″ N. 135° 20′ 55″ W.	NPB	150	U.S. Navy ..	300, 600	P G[6 13]	N	0.30[7]	—
Snag Point	Bristol Bay 59° 02′ 30″ N. 158° 27′ 15″ W.	KHF	200	Alaska Packers Association	300, 500, 600	P[5] ..	X[4]	—	—
Sulzer, Alaska ..	—	KKAA	—	Charles A. Sulzer	550	P ..	X	—	—
Tenekee	—	KYG	—	Columbia Salmon Co.	300, 550, 600	P ..	X	—	—
Ugashik	57° 34′ 28″ N. 157° 35′ 00″ W.	KMU	50–70	Red Salmon Canning Co.	300, 500, 600	—[1]	X	—	—
Unga Island, Alaska	—	KVI	—	—	—	—	—	—	—
Washington Bay, Alaska	—	KQS	—	Petersburg Packing Co.	—	—	—	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
	Meridian of Greenwich.							Francs.	Francs.	
ALASKA—*contd.*										
Wrangell[3]	Alexander Archipelago 56° 28′ 19″ N. 132° 23′ 12″ W.	WVJ	40	U.S. Army ..	300, 450, **600**	P G ..	—	0.30	—	
Yakutat, Alaska ..	—	KKA	—	Libby, McNeill and Libby	300, 450, **600**	P	X	—	—	
ALGERIA										
Oran, Ain el Turck ..	To the west of Oran 35° 45′ 00″ N. 0° 45′ 30″ W.	FUK	—	Navy	—	O ..	Greenwich Time. 0900 to 0000			[1] The coast charge is reduced to fr.0.15 per word for correspondence with ships engaged in a regular service between France and Corsica, Algeria, Tunis
Alger T.S.F. ..	To the east of Algiers 36° 45′ 00″ N. 3° 11′ 00″ E.	FFA	400	Postal, Telegraph and Telephone Administration	300, **600**	PG ..	N	0.40[1]	—	
ANGOLA (**Portuguese West Africa**)										
Cabinda[1]	—	—	—	Government ..	—	—	—	—	—	[1] Under construction [2] Working provisionally [3] Provisional
Camaxilo[1]	—	—	—	Government ..	—	—	—	—	—	
Cangamba[1]	—	—	—	Government ..	—	—	—	—	—	
Caquingue[1]	—	—	—	Government ..	—	—	—	—	—	
Cuangar[1]	—	—	—	Government ..	—	—	—	—	—	
Cuanhama[1]	—	—	—	Government ..	—	—	—	—	—	
Cuito Cuanavale[1] ..	—	—	—	Government ..	—	—	—	—	—	
Dirico[1]	—	—	—	Government ..	—	—	—	—	—	
Encoge[1]	—	—	—	Government ..	—	—	—	—	—	
Huambo[1]	—	—	—	Government ..	—	—	—	—	—	
Loanda[3]	8° 48′ 00″ S. 13° 13′ 00″ E.	CRL[3]	—	Government ..	**600**, 1,200, 1,600, 2,400	P G ..	—	0.40	—	
Lobito[2]	—	CRO[3]	—	Government ..	**600**	P G ..	—	0.10	—	
Lubango[1]	—	—	—	Government ..	—	—	—	—	—	
Luio[1]	—	—	—	Government ..	—	—	—	—	—	
Malange[1]	—	—	—	Government ..	—	—	—	—	—	
Maquela[1]	—	—	—	Government ..	—	—	—	—	—	
Mossamedes[1] ..	—	—	—	Government ..	—	—	—	—	—	
Moxico[1]	—	—	—	Government ..	—	—	—	—	—	
Mulondo[1]	—	—	—	Government ..	—	—	—	—	—	
Novo Redondo[3] ..	—	CRN[3]	—	Government ..	**600**	P G ..	—	0.10	—	

Posto A[1]	—	—	—	Government ..	—	—	—	—	—	
Quanza[1]	—	—	—	Government ..	—	—	—	—	—	
Quati[1]	—	—	—	Government ..	—	—	—	—	—	
San Thome Island[1] ..	0° 05′ 00″ N. 6° 33′ 00″ E.	—	—	Government ..	600, 1,200, 2,400	—	—	—	—	
Saurimo[1]	—	—	—	Government ..	—	—	—	—	—	
ANNAM										
Tourane	Tourane Bay, Observatory Islet 16° 06′ 55″ N. 108° 12′ 41″ E.	FLT	250	Government ..	300, 600, 1,800	PG, O ..	Seventh Time Belt east of the Greenwich Belt. 0700 to 1100 1400 to 1700	0.25	2.00	
ARGENTINA										
Año Nuevo	Ano Nuevo 54° 39′ 30″ S. 64° 09′ 20″ W.	LIG	435	Navy	600, 1,800	O ..	Mean Time of the Meridian of Cordoba.[1] 1200 to 0000	—	—	
Cabo de las Virgenes	Entrance to the Strait of Magellan 52° 22′ 05″ S. 68° 23′ 52″ W.	LIF	270	Navy	300, 600	PG	N	0.60	6.00	
Comodoro Rivadavia	Gulf of St. George 45° 51′ 20″ S. 67° 28′ 50″ W.	LIP	270	Navy	300, 600	PG	N	0.60	6.00	
Dársena Norte ..	North entrance to the Port of Buenos Aires 34° 35′ 00″ S. 58° 22′ 10″ W.	LIA	435	Navy	300, 600, 800	PG[2]	N	0.60	6.00	
Dársena Sud.. ..	South entrance to the Port of Buenos Aires 34° 37′ 54″ S. 58° 21′ 10″ W.	LIK	270	Navy	600	O	X	—	—	
Faro Mogotes[3] ..	At the South of the Cap Corrientes 38° 05′ 30″ S. 57° 32′ 51″ W.	LIC	270	Navy	300, 600	PG	N	0.60	6.00	
Faro Recalada[3] ..	Rio de la Plata 35° 10′ 30″ S. 56° 18′ 30″ W.	LID	50	Navy	450, 600	PG	0900 to 1100 1400 to 1600 2000 to 0000	0.60	6.00	
Formosa, Argentina[4]	Government of Formosa 26° 16′ 00″ S. 58° 12′ 00″ W.	LIJ	270	Navy	450, 600	O	1200 to 0000	—	—	
Martin Garcia ..	34° 11′ 09″ S. 58° 15′ 26″ W.	LIX	100	Navy	300, 600	PG	N	0.60	6.00	
Paz, Entre Rios (La)	Province of Entre Rios 30° 42′ 00″ S. 59° 38′ 00″ W.	LII	270	Navy	450, 600	O	1200 to 0000	—	—	

[1] Mean time of the meridian of Cordoba, 4 hours 16 minutes, 48.22 seconds later than Greenwich time

[2] Time signals transmitted daily. For full particulars see International Time and Weather Signals—Argentina

[3] Lighthouse.

[4] Interior station.

[5] The working of the station is temporarily suspended

[6] The station is open for public correspondence in the inland service

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
ARGENTINA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Pontón Estacionario de Practicos Interseccion	Anchored in Canal near to buoy 37, port of Buenos Aires	LIU	30	Navy	300, **600**	O[5]	X	—	—	
Ponton Faro, Bahia Blanca[3]	Entrance to Bahia Blanca 39° 10′ 48″ S. 61° 39′ 27″ W.	LIN	50	Navy	300, **600**	O	X	—	—	
Posadas Misiones[4] ..	27° 22′ 00″ S. 55° 54′ 00″ W.	LIQ	270	Navy	300, **600**	PG[6]	1200 to 0000	—	—	
Puerto Aguirre[4] ..	25° 35′ 00″ S. 54° 34′ 00″ W.	LIR	150	Navy	300, **600**	PG[6]	1200 to 0000	—	—	
Puerto Militar ..	Near Bahia Blanca 38° 53′ 30″ S. 62° 06′ 02″ W.	LIE	435	Navy	300, **600**	PG	N	0.60	6.00	
Punta Delgada, Chubut	Valdes Peninsula 42° 46′ 00″ S. 63° 36′ 05″ W.	LIL	270	Navy	300, **600**	PG	N	0.60	6.00	
Rio Grande, Tierra del Fuego	Tierra del Fuego 53° 46′ 30″ S. 67° 46′ 00″ W.	LIS	270	Navy	300, **600**	PG	0000 to 1200	0.60	6.00	
Rio Santiago, Buenos Aires	Near Buenos Aires 34° 50′ 57″ S. 57° 51′ 53″ W.	LIB	270	Navy	600	O	N	—	—	
San Julian, Santa Cruz	49° 17′ 26″ S. 67° 43′ 57″ W.	LIM	300	Navy	300, **600**	PG	N	0.60	6.00	
Ushuaia	Tierra del Fuego 54° 48′ 50″ S. 68° 20′ 00″ W.	LIH	150	Navy	300, **600**	PG	N	0.60	6.00	
Zarate, Buenos Aires	34° 09′ 00″ S. 59° 04′ 00″ W.	LIW	300	Navy	600, **800**	O	N	—	—	
ASCENSION ISLAND										
Ascension	7° 59′ 00″ S. 14° 19′ 00″ W.	BZO	—	Government ..	600[1], 4,000, 4,260	PG, O	N	0.60	—	[1] Other wave-lengths are used for official correspondence

AUSTRALIAN COMMONWEALTH

Adelaide Radio ..	South Australia 34° 52′ 00″ S. 138° 31′ 00″ E.	VIA	450	Government ..	300, 450, **600**	PG[3 4]	0600 to 0100[14]	0.30[1] 0.60[2]	—	
Brisbane Radio ..	Queensland 27° 25′ 30″ S. 153° 01° 45″ E.	VIB	450	Government ..	300, 450, **600**	PG[3]	N	0.30[1] 0.60[2]	—	
Broome Radio ..	Western Australia 18° 00′ 00″ S. 122° 12′ 00″ E.	VIO	450	Government ..	300, 450, **600**	PG[5]	N	0.30[1] 0.60[2]	—	
Cooktown Radio ..	Queensland 15° 27′ 45″ S. 145° 15′ 30″ E.	VIC	450	Government ..	300, 450, **600**	PG[5]	0600 to 0100[15]	0.30[1] 0.60[2]	—	
Darwin Radio ..	Northern Territory 12° 27′ 30″ S. 130° 48′ 30″ E.	VID	450	Government ..	300, 450, **600**	PG[5]	N	0.30[1] 0.60[2]	—	
Esperance Radio ..	Western Australia 33° 51′ 00″ S. 121° 55′ 00″ E.	VIE	450	Government ..	300, 450, **600**	PG[5]	0600 to 0100[10]	0.30[1] 0.60[2]	—	
Flinders Island Radio	Tasmania 40° 01′ 00″ S. 147° 52′ 15″ E.	VIL	450	Government ..	300, 450, **600**	PG[5 6]	0900 to 1800[15] Closed Sundays	0.30[1 7] 0.60[2 7]	—	
Geraldton Radio ..	Western Australia 28° 46′ 00″ S. 114° 35′ 00″ E.	VIN	450	Government ..	300, 450, **600**	PG[5]	0900 to 2300 [9]	0.30[1] 0.60[2]	—	
Hobart Radio ..	Tasmania 42° 51′ 45″ S. 147° 19′ 30″ E.	VIH	300	Government ..	300, 450, **600**	PG[3]	0900 to 2300[15]	0.30[1] 0.60[2]	—	
King Island	N.W. of Tasmania 40° 00′ 00″ S. 144° 00′ 00″ E.	VZE	—	Government ..	—	PG[6]	—	0.30[1] 0.60[2]	—	
Melbourne Radio ..	Victoria 37° 50′ 00″ S. 144° 58′ 30″ E.	VIM	450	Government ..	300, 450, **600**	PG[3 4]	N	0.30[1] 0.60[2]	—	
Mount Gambier Radio	South Australia 37° 50′ 00″ S. 140° 49′ 00″ E.	VIY	400	Government ..	300, 450, **600**	PG[5]	0900 to 1800[14] Closed Sundays	0.30[1] 0.60[2]	—	
Perth Radio ..	Western Australia 32° 01′ 00″ S. 115° 52′ 00″ E.	VIP	400[11] 1,250[12]	Government ..	300, 450, **600**, 2,500	PG[4 5]	N	0.30[1] 0.60[2]	—	
Rockhampton Radio	Queensland 23° 23′ 45″ S. 150° 33′ 00″ E.	VIR	450	Government ..	300, 450, **600**	PG[5]	060 to 2000[15]	0.30[1] 0.60[2]	—	
Roebourne Radio ..	Western Australia 20° 44′ 15″ S. 117° 12′ 15″ E.	VIZ	450	Government ..	300, 450, **600**	PG[5]	0600 to 2000 [16]	0.30[1] 0.60[2]	—	

[1] For radiotelegrams exchanged with ships subject to the administration of Australia or of New Zealand

[2] For radiotelegrams exchanged with ships other than those subject to the administration of Australia or of New Zealand

[3] Meteorological forecasts are transmitted free of charge by coast stations at the following hours (Melbourne time): Adelaide Radio, 1900 and 2030; Melbourne Radio, 1930 and 2100; Sydney Radio, 2000 and 2130; Hobart Radio, 2200; Brisbane Radio, 2230 and 2300

[4] The station transmits time signals (see International Time and Weather Signals)

[5] The station transmits weather forecasts when necessary or when requested by vessels

[6] Connected with the International Telegraph System by wireless through Melbourne Radio

[7] In the case of radiotelegrams originating at or intended for Flinders Island the charge for local delivery is included in the coast tax

[8] The working of the station is temporarily suspended

[9] Connected with the International Telegraph system by wireless through Hobart Radio

[10] Mean time of the meridian 120° E. of Greenwich

[11] With wave-length of 600 metres

[12] With wave-length of 2,500 metres

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
AUSTRALIAN COMMONWEALTH—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Sydney Radio ..	New South Wales 33° 40′ 00″ S. 151° 00′ 00″ E.	VIS	400[11] 1,250[12]	Government ..	300, 450, **600**, 2,500	PG[5]	0700 to 0200[15]	0.30[1] 0.60[2]	—	[13] Connected with the International Telegraph system by wireless through Townsville Radio
Thursday Island Radio	Queensland Torres Strait 10° 35′ 15″ S. 142° 12′ 45″ E.	VII	500	Government ..	300, 450, **600**	PG[5]	N	0.30[1] 0.60[2]	—	[14] Mean time of the meridian 142° 30′ E. of Greenwich
Townsville Radio ..	Queensland 19° 15′ 30″ S. 146° 50′ 00″ E.	VIT	450	Government ..	300, 450, **600**	PG[5]	N	0.30[1] 0.60[2]	—	[15] Mean time of the meridian 150° E. of Greenwich
Woodlark Island ..	Off New Guinea 9° 05′ 00″ S. 152° 45′ 00″ E.	VIF	—	Government ..	—	PG[13]	—	0.30[1] 0.60[2]	—	
Wyndham Radio ..	Western Australia 15° 35′ 00″ S. 128° 18′ 00″ E.	VIW	450	Government ..	300, 450, **600**	PG[5]	0600 to 2000[16]	0.30[1] 0.60[2]	—	
AZORES										[1] The station only uses, provisionally, the wave-length of 300 metres
Corvo	39° 40′ 10″ N. 31° 07′ 35″ W.	PQC	65	Government ..	300, **600**[1]	—[2]	—[3]	—	—	[2] The station only corresponds with the radio-telegraphic stations situated in the Azores
Faial	38° 38′ 00″ N. 28° 44′ 10″ W.	PQH	130	Government ..	300, **600**[1]	P G[4] ..	N	0.40	—	[3] Greenwich Time: October to March, 0800 to 1700; holidays, 0800 to 1300. April to September, 0800 to 1400, 1500 to 1900; holidays, 0800 to 1300
Flores	39° 27′ 35″ N. 31° 08′ 10″ W.	PQF	130	Government ..	300, **600**[1]	P G[4] ..	N	0.40	—	
Ponta Delgada ..	37° 47′ 00″ N. 25° 40′ 00″ W.	BWP	—	Admiralty ..	**600**	—	—	—	—	
Santa Maria ..	36° 59′ 55″ N. 25° 08′ 20″ W.	PQK	65	Government ..	300, **600**[1]	P G[4] ..	N	0.40	—	
San Miguel	37° 44′ 30″ N. 25° 42′ 50″ W.	PQM	65	Government ..	300, **600**[1]	P G[4] ..	N	0.40	—	[4] The station also exchanges radiotelegrams with the other coast stations situated in the Azores, within its radius of operation
Terceira	38° 39′ 55″ N. 27° 07′ 34″ W.	PQT	400	Government ..	300, **600**, 900,[5] 1,200,[5] 1,800	P G ..	N	0.40	—	[5] Used for correspondence with fixed stations

BAHAMAS										
Nassau, Bahamas ..	25° 04′ 00″ N. 77° 22′ 00″ W.	VPN	400	Government ..	**600**, 1,800	P G ..	Mean Time of the Meridian 75° W. of Greenwich. 0700 to 1500	0.30[1]	3.00[1]	[1] In the case of radiotelegrams originating at or intended for Nassau the local land line charge is included in the coast tax
BARBADOS (West Indies)										
Barbados	13° 04′ 00″ N. 59° 36′ 45″ W.	VPO	160	Government ..	**600**	O, P G ..	N[1]	0.60	6.00	[1] On Sundays and holidays working is suspended between 0600 and 1800
BELGIAN CONGO ..										
Banana	Lower Congo 5° 59′ 35″ S. 12° 20′ 02″ E.	ONA	400–1,000	Belgian Congo ..	300, **600**, 2,250	P G ..	Greenwich Time. 0700 to 1130, 1400 to 1700[1] Holidays: 0700 to 1030 1600 to 1700[1]	0.30	—	[1] The hours are extended on the dates of arrival and departure of the regular steamers [2] Inland station [3] Open for public correspondence in the inland service [4] Provisional
Basankusu[2] ..	District of Lulonga 1° 14′ 05″ N. 19° 46′ 00″ E.	OQU	300	Belgian Congo ..	2,100	—[3]	0700 to 1130 1400 to 1700 Sundays and holidays: 0700 to 1030 1600 to 1700	—	—	
Basoko[2]	Aruwimi 1° 14′ 00″ N. 23° 36′ 00″ E.	OQO	300	Belgian Congo ..	2,550	—[3]	Ditto	—	—	
Boma[2]	Lower Congo 5° 51′ 00″ S. 13° 06′ 00″ E.	OQB	300	Belgian Congo ..	2,100	—[3]	Ditto	—	—	
Bunia-Kilo[2] ..	1° 42′ 00″ N. 30° 00′ 00″ E.	BIA[4]	300	Belgian Congo ..	4,300	—[3]	Ditto	—	—	
Coquilhatville[2] ..	0° 04′ 00″ N. 18° 18′ 00″ E.	OQC	300	Belgian Congo ..	3,200	—[3]	Ditto	—	—	
Elisabethville[2] ..	Upper Luapula 11° 38′ 00″ S. 27° 31′ 00″ E.	OQH	300	Belgian Congo ..	3,000	—[3]	Ditto	—	—	
Kikondja[2]	Tanganika Moero 8° 19′ 00″ S. 26° 25′ 00″ E.	OQK	300	Belgian Congo ..	2,400	—[3]	Ditto	—	—	
Kindu[2]	Maniema 2° 56′ 00″ S. 25° 56′ 00″ E.	OQD	300	Belgian Congo ..	1,950, 2,300	—[3]	Ditto	—	—	
Kinshasha[2]	Middle Congo 4° 18′ 22″ S. 15° 21′ 57″ E.	OQL	300	Belgian Congo ..	3,600	—[3]	Ditto	—	—	
Kongolo[2]	Tanganika Moero 5° 23′ 00″ S. 26° 59′ 00″ E.	OQG	300	Belgian Congo ..	2,700	—[3]	Ditto	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
BELGIAN CONGO—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Lukula [2]	Tanganika Moero 5° 55′ 40″ S. 29° 15′ 00″ E.	LGA [4]	300	Belgian Congo ..	3,800	—	0700 to 1130, 1400 to 1700 Sundays and holidays: 0700 to 1030 1600 to 1700	—	—	
Lusambo [3]	Sankura 5° 00′ 00″ S. 23° 05′ 00″ E.	OQM	300	Belgian Congo ..	4,000	—[3]	Ditto	—	—	
Stanleyville [3] ..	0° 30′ 00″ N. 25° 14′ 00″ E.	OQS	300	Belgian Congo ..	3,400	—[3]	Ditto	—	—	
Umangi [3]	Bangala 2° 06′ 43″ N. 21° 26′ 52″ E.	OQI	300	Belgian Congo ..	2,750	—[3]	Ditto	—	—	
BELGIUM										
Anvers	51° 21′ 42″ N. 4° 27′ 12″ E.	OSA	100–150	Government ..	500, **600**	P G ..	N	0.20 [1]	2.00 [1]	[1] In the communications with the packet boats of the Belgian State making their passage between Ostende and Dover there is no special coast tax. The total wireless tax is 3 francs for 10 words or less, and 20 centimes for each word over ten
Ostende	51° 13′ 28″ N. 2° 55′ 13″ E.	OST	150–250	Government ..	300, 450, **600**	P G ..	N	0.20 [1]	2.00 [1]	
BERMUDA										
Bermuda	32° 20′ 00″ N. 64° 45′ 00″ W.	BZB	—	British Admiralty	—	O ..	—	—	—	
Somerset Island ..	32° 20′ 00″ N. 64° 25′ 00″ W.	BZR	500	British Admiralty	**600** [1]	P G, O..	N	0.60	6.00	[1] Other wave-lengths are used for official correspondence
BOLIVIA										
Balliviàn	22° 40′ 00″ S. 61° 55′ 00″ W.	CPA	220	Government ..	900	—	0600, 0800 1400 to 1600	—	—	
Cachuela Esperanza	10° 35′ 00″ S. 65° 40′ 00″ W.	CPJ	90	Government ..	1,000	—	0600, 0700, 2200 to 2300	—	—	
Cobija	11° 00′ 00″ S. 68° 55′ 00″ W.	CPG	120	Government ..	1,500, 1,800	—	0600, 0800, 1500 to 1600, 2100 to 2200	—	—	
Fortin D'Orbigny ..	21° 55′ 00″ S. 62° 55′ 00″ W.	CPB	220	Government ..	900	—	0600, 0800, 1400 to 1600	—	—	

Fortin Esteros de Patiño	23° 30′ 00″ S. 60° 45′ 00″ W.	CPC	220	Government ..	900	—	0600, 0800, 1400 to 1600	—	—	
Guayaramerin ..	10° 45′ 00″ S. 65° 25′ 00″ W.	CPK	60	Government ..	1,000	—	0600, 0700, 2200 to 2300	—	—	
Manoa	9° 35′ 00″ S. 65° 20′ 00″ W.	CPL	90	Government ..	1,000	—	0600, 0700, 2200 to 2300	—	—	
Puerto Suarez[1] ..	18° 55′ 00″ S. 57° 50′ 00″ W.	—	—	Government ..	—	—	—	—	—	
Riberalta	11° 00′ 00″ S. 66° 05′ 00″ W.	CPE	720	Government ..	2,600, 3,300	—	0700, 1100, 2005 to 0000	—	—	[1] Under construction
Santa Cruz[1] ..	17° 40′ 00″ S. 63° 10′ 00″ W.	—	—	Government ..	—	—	—	—	—	
Trinidad	14° 50′ 00″ S. 64° 45′ 00″ W.	CPH	300	Government ..	1,500	—	0700, 1000, 2000 to 2200	—	—	
Viacha	16° 35′ 00″ S. 68° 25′ 00″ W.	CPF	720	Government ..	2,600, 3,300	—	0800, 1100, 2005 to 0000	—	—	
Villa Bella	10° 25′ 00″ S. 65° 25′ 00″ W.	CPI	90	Government ..	1,000	—	0600, 0700, 2200 to 2300	—	—	
Yacuiba	22° 00′ 00″ S. 63° 45′ 00″ W.	CPD	600	Government ..	2,600, 3,300	—	0800, 1000	—	—	
BORNEO (British) ..										
Jesselton	5° 58′ 00″ N. 116° 04′ 00″ E.	VQA	400	Government ..	300, 450, 600, 1,200, 2,800	P G[1] ..	0800 to 1100, 1400 to 1700[2] (2000 to 2200)[3]	0.40	—	[1] The station also communicates with other stations in North Borneo [2] Hong Kong zone time [3] If necessary
Kudat	6° 52′ 00″ N. 116° 50′ 00″ E.	VQD	400	Government ..	300, 450, 600, 1,200, 2,800	P G[1] ..	0800 to 1100, 1400 to 1700[2] (2000 to 2200)[3]	0.40	—	
Sandakan	5° 50′ 00″ N. 118° 07′ 00″ E.	VQB	400	Government ..	300, 450, 600, 1,200, 2,800	P G[1] ..	0800 to 1100, 1400 to 1700[2] (2000 to 2200)[3]	0.40	—	
Tawao	4° 15′ 00″ N. 117° 54′ 00″ E.	VQC	400	Government ..	300, 450, 600, 1,200, 2,800	P G[1] ..	0800 to 1100, 1400 to 1700[2] (2000 to 2200)[3]	0.40	—	
BRAZIL										
Abrolhos	Bahia 17° 57′ 30″ S. 38° 41′ 46″ W.	SNN	100	Navy	300	O ..	—	—	—	[1] In the case of radiotelegrams originating at or intended for the places named against the letter in reference, the charge for transmission between such places and the coast station is included in the coast tax (a) Bahia (San Salvador) (b) Rio de Janeiro (c) Rio de Janeiro or Campos (d) Fernando de Noronha or Recife (Pernambuco)
Amaralina	Bahia 13° 01′ 00″ S. 38° 28′ 00″ W.	SPA	400	Government ..	300, 600, 1,000, 2,000	O, P G..	N	0.60[1] (a)	6.00[1] (a)	
Anhatomirim ..	S. Catharina 27° 25′ 32″ S. 48° 34′ 20″ W.	SOD	600	Navy	600, 1,200, 2,000	O ..	—	—	—	
Babylonia	Rio de Janeiro 22° 55′ 40″ S. 43° 10′ 10″ W.	SPY	200	Government ..	300, 600	O, P G..	N	0.60[1] (b)	6.00[1] (b)	
Belém, Pará ..	1° 26′ 59″ S. 48° 30′ 06″ W.	SPB	750	Government ..	300, 600, 1,800	P G ..	N	0.60	6.00	
Cabo de São Thomé	Rio de Janeiro (State) 22° 02′ 00″ S. 40° 58′ 35″ W.	SPT	750	Government ..	300, 600	O, P G..	N	0.60[1] (c)	6.00[1] (c)	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
BRAZIL—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Cruzeiro do Sul[2] ..	District of Acre 7° 38′ 28″ S. 72° 36′ 15″ W.	SQC	400	Government ..	**600**, 3,000	—[3]	1800 to 0600[5]	—	—
Escola Naval ..	23° 00′ 45″ S. 44° 19′ 35″ W.	SOV	50	Navy	300	O ..	—	—	—
Escola Radio[4] ..	Rio de Janeiro 22° 55′ 40″ S. 43° 10′ 10″ W.	SPE	200	—	300, **600**	O ..	X	0.60	6.00
Fernando de Noronha	3° 50′ 30″ S. 32° 25′ 12″ W.	SPN	1,000	Government ..	300, **600**, 1,800	O, P G..	N	0.60[1] (d)	6.00[1] (d)
Forteleza da Lage ..	Rio de Janeiro Bay 22° 56′ 03″ S. 43° 09′ 00″ W.	PTL	150	Government ..	450, **600**, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Forteleza de Imbuhy	Rio de Janeiro (State) 22° 57′ 02″ S. 43° 06′ 56″ W.	PTI	150	Government ..	450, **600**, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Forteleza de Santa Cruz	Rio de Janeiro Bay 22° 56′ 03″ S. 43° 08′ 00″ W.	PTC	150	Government ..	450, **600**, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Forteleza de S. João	Rio de Janeiro Bay 22° 56′ 40″ S. 43° 09′ 12″ W.	PTJ	150	Government ..	450, **600**, 900	O ..	2000 to 2100[6]	—	—
Ilha das Cobras ..	Rio de Janeiro Bay 22° 52′ 00″ S. 43° 09′ 00″ W.	SNI	150	Navy	600	O ..	—	—	—
Ilha da Trinidad ..	20° 30′ 00″ S. 29° 22′ 00″ W.	SOF	700	Navy	600	O ..	—	—	—
Ilha do Governador..	Rio de Janeiro Bay 22° 49′ 25″ S. 43° 07′ 58″ W.	SOH	800	Navy	600, **1,200**, 2,000	O[7] ..	—		—
Ilha Raza	Entrance of the Bay of Rio de Janeiro 23° 03′ 40″ S. 43° 08′ 45″ W.	SNZ	150	Navy	600	O ..	—	—	—

Remarks.

(e) Pelotas or Rio Grande do Sul
(f) Santos
(g) Olinda or Recife (Pernambuco)

[2] Interior station
[3] The station is open for public correspondence in the inland service
[4] Instructional station
[5] Fifth time belt west of the Greenwich belt
[6] Third time belt west of the Greenwich belt
[7] This station transmits a time signal. For full particulars see International Time and Weather Signals
[8] Fourth time belt west of the Greenwich belt

Juncção	Rio Grande do Sul 32° 04′ 00″ S. 52° 07′ 00″ W.	SPJ	750	Government ..	300, 600	O, P G ..	N	0.60[1] (e)	6.00[1] (e)
Labrea, Brazil[3] ..	—	SQL	—	Government ..	—	—[3]	N	—	—
Ladario[3]	Matto Grosso	SNU	—	Government ..	—	—[3]	—	—	—
Manáos[3]	Amazonas 3° 08′ 05″ S. 60° 01′ 45″ W.	SQM	750	Government ..	2,400, 3,500	—[3]	N	—	—
Mont' Serrat.. ..	Near Santos 23° 56′ 27″ S. 46° 19′ 34″ W.	SPS	200	Government ..	300, 600	O, P G ..	0600 to 0000[6]	0.60[1] (f)	6.00[1] (f)
Natal Norte ..	Rio Grande do Norte	SNR	—	Government ..	—	O, P G ..	N	0.60	6.00
Nictheroy	Rio de Janeiro (State) 22° 52′ 52″ S. 43° 07′ 40″ W.	PTN	150	Government ..	450, 600, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Olinda, Pernambuco	Near Pernambuco 8° 00′ 35″ S. 34° 51′ 00″ W.	SPO	590	Government ..	300, 600	O, P G	N	0.60[1] (g)	6.00[1] (g)
Porto Velho[3] ..	Matto Grosso 8° 46′ 00″ S. 63° 55′ 00″ W.	SQV	750	Government ..	2,400, 3,500	—[3]	N	—	—
Quartel General ..	Rio de Janeiro 22° 54′ 25″ S. 43° 11′ 30″ W.	PTQ	150	Government ..	450, 600, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Rio Branco[3] ..	District of Acre 9° 58′ 05″ S. 67° 52′ 05″ W.	SQR	210	Government ..	1,000, 2,000	—[3]	1800 to 0600[5]	—	—
Santarém Pará[3] ..	2° 24′ 48″ S. 54° 42′ 58″ W.	SQS	400	Government ..	600, 2,000	—[3]	1800 to 0600[6]	—	—
Sao Luiz	Maranhao	SOM	—	Government ..	—	O ..	—	—	—
Senna Madureira[3] ..	District of Acre 9° 03′ 57″ S. 68° 39′ 35″ W.	SQN	400	Government ..	1,500, 3,000	—[3]	N	—	—
Tarauacá[3]	District of Acre 8° 20′ 55″ S. 70° 43′ 30″ W.	SQT	210	Government ..	1,500, 3,000	—[3]	1800 to 0600[5]	—	—
Villa Militar ..	Rio de Janeiro 22° 49′ 27″ S. 43° 24′ 52″ W.	PTV	150	Government ..	450, 600, 900	O ..	1100 to 1600 2000 to 2100[6]	—	—
Xapury[3]	District of Acre 10° 39′ 10″ S. 68° 36′ 30″ W.	SQX	210	Government ..	1,000, 2,000	—[3]	1800 to 0600[5]	—	—
BRITISH EAST AFRICA							Mombassa Time		
Kismayu	0° 21′ 23″ S. 42° 33′ 39″ E.	VQQ	350	Government ..	600, 960, 1,200	P G ..	0800 to 1700	0.60	—
Mombassa	4° 03′ 00″ S. 39° 46′ 00″ E.	VPQ	350	Government ..	600, 1,200, 1,800	P G ..	0800 to 1700	0.60	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
BRITISH GUIANA										
Demerara	6° 49′ 24″ N. 58° 11′ 00″ W.	BZL	1,000	British Admiralty	600-2,000 (spark) 4,000, 4,200, 5,000 (arc)	P G[1] [2] O	N	0.60	—	[1] The station also exchanges official and public correspondence with Trinidad [2] In the case of interruption of the cable lines the wireless station at Demerara carries on the service. Telegrams for the United Kingdom are transmitted to Bermuda; and those for the United States are transmitted to Jamaica
BRITISH HONDURAS										
Belize	17° 30′ 39″ N. 88° 11′ 20″ W.	VPP	400	Government ..	600	P G[1] ..	0000 to 0030 0200 to 0230 0400 to 0430 0640 to 1000 1345 to 1545	0.50[2]	5.00[2]	[1] Traffic for the United States and United Kingdom is handled via the United Fruit Company's station at Swan Island [2] This includes the charge for transmission over the telegraph lines of the colony
BRITISH SOMALILAND							Mean Time of Aden.[3]			
Berbera Radio ..	10° 26′ 00″ N. 45° 01′ 30″ E.	VPJ	250	Government ..	300, **600**, 900	P G[1] ..	0600 to 1800 2000 to 2030	0.60[2]	—	[1] The station also exchanges public and official correspondence with Aden Radio [2] In the case of radiotelegrams neither originating at nor intended for Berbera itself, the coast charge is included in the charge of fr. 0.625 for transmission between Aden and Berbera [3] 3 hours in advance of Greenwich time [4] Temporarily closed [5] Communicates with Berbera and Burao [6] Interior station
Bulhar[4]	10° 22′ 00″ N. 44° 21′ 00″ E.	—	—	Government ..	600	—	—	—	—	
Burao	9° 35′ 00″ N. 45° 33′ 00″ E.	VQX	—	Government ..	900	—	—	—	—	
Hargeisa[6]	—	VSA	—	Government ..	900	O[5] ..	—	—	—	
Las Dureh[6]	—	VQY	—	Government ..	900	O[5] ..	—	—	—	

BURMA										
Cape Negrais	—	VTG	—	—	—	—	—	—	—	[1] During the daytime the station is largely occupied with inland communication.
Diamond Island	Mouths of the Irawadi 15° 51′ 00″ N. 94° 15′ 00″ E.	VTD	300	Government ..	300, **600**	P G[1] ..	N	0.35	—	[2] Inland communication
Maymyo[2]	20° 02′ 00″ N. 96° 29′ 00″ E.	VTM	—	Government ..	—	O ..	—	—	—	[3] Information regarding weather is distributed twice daily from the station at 0110 and 1310 (Indian standard time)
Port Blair	South Andaman Island 11° 41′ 00″ N. 92° 45′ 00″ E.	VTP	300	Government ..	400, **800**	PG[3] ..	N	0.35	—	[4] Information regarding weather is distributed twice daily from the station at 0100 and 1300 (Indian standard time)
Rangoon Radio ..	Lower Burma 96° 07′ 00″ E. 16° 47′ 00″ N.	VTR	300	Government ..	300, **600**	P G[4] ..	N	0.35	—	
Preparis Island ..	15° 57′ 00″ N. 93° 40′ 00″ E.	VTS	—	Government ..	—	—	—	—	—	
Table Island.. ..	14° 09′ 00″ N. 93° 23′ 00″ E.	VTT	—	Government ..	—	O ..	—	—	—	
Victoria Point ..	Extreme South of Lower Burma 9° 59′ 00″ N. 98° 32′ 30″ E.	VTV	300	Government ..	300, **600**, 700	P G[1] ..	N	0.35	—	
CAMEROONS										
Duala	4° 02′ 41″ N. 9° 40′ 50″ E.	FKF	—	—	—	O ..	—	—	—	
CANARY ISLANDS										
Las Palmas	28° 00′ 00″ N. 15° 22′ 10″ W.	EAL	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G ..	N	0.45	4.50	
Teneriffe	28° 28′ 30″ N. 16° 15′ 00″ W.	EAT	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G ..	N	0.45	4.50	
CANADA										
Alert Bay	British Columbia (Cormorant Island) 50° 35′ 20″ N. 126° 55′ 36″ W.	VAF	350	Government, Naval	300, **600**, 1,600	P G[1] ..	N	0.62[2]	—	[1] Weather forecasts transmitted free of charge on request. Messages concerning navigation to any department or officer of the Government handled free of coast tax. Weather and ice reports from captain of a vessel also free of coast charge
Barrington Passage..	Nova Scotia 43° 23′ 00″ N. 65° 37′ 00″ W.	VAL	—	Government, Naval	—	O ..	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
CANADA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Camperdown, Nova Scotia	Halifax 44° 31′ 11″ N. 63° 37′ 07″ W.	VCS	250	Marconi Co. ..	300, **600**	P G [1 3]	N	0.30 [5]	—	
Canso [6]	45° 19′ 24″ N. 60° 58′ 25″ W.	VAX	100	—	600	D F [6] ..	—	—	—	
Cape Bear	Prince Edward Island 46° 00′ 45″ N. 62° 27′ 15″ W.	VCP	150	Marconi Co. ..	300, **600**	P G [1] ..	December to March, N April to November, 0800 to 2000 [4]	0.15	—	
Cape Lazo	Vancouver Island 49° 42′ 20″ N. 124° 52′ 43″ W.	VAC	350	Government, Naval	300, **600**	P G [1] ..	N	0.60 [2 7]	—	
Cape Sable	Nova Scotia 43° 23′ 19″ N. 65° 37′ 15″ W.	VCU	250	Marconi Co. ..	300, **600**	P G [1 3] ..	N	0.85 [5]	—	
Chebucto Head [6] ..	44° 30′ 01″ N. 63° 31′ 20″ W.	VAV	250	—	600	D F [6] ..	—	—	—	
Clarke City	Quebec 50° 11′ 00″ N. 66° 37′ 17″ W.	VCK	250	Marconi Co. ..	300, **600**	P G [1] ..	N [8]	0.30	—	
Dead Tree Point ..	British Columbia (Graham Island) 53° 21′ 30″ N. 131° 55′ 55″ W.	VAH	200	Government, Naval	300, **600**	P G [1] ..	0800 to 1800 [7]	0.60 [2]	—	
Digby Island ..	British Columbia 54° 17′ 02″ N. 130° 22′ 33″ W.	VAJ	250	Government, Naval	300, **600**	P G [1] ..	N	0.60 [2]	—	
Estevan, British Columbia	Vancouver Island 49° 22′ 05″ N. 126° 32′ 22″ W.	VAE	500	Government, Naval	300, **600**	P G [1] ..	N	0.60 [2]	—	
Fame Point	Gulf of St. Lawrence 49° 06′ 48″ N. 64° 36′ 20″ W.	VCG	250	Marconi Co. ..	300, **600**	P G [1] ..	N [8]	0.30	—	
Father Point ..	Quebec 48° 31′ 30″ N. 68° 27′ 40″ W.	VCF	350	Marconi Co. ..	300, **600**	P G [1] ..	N [8]	0.15	—	
Glace Bay ..	Nova Scotia 46° 08′ 00″ N. 59° 55′ 00″ W.	GB	3,125	Marconi Co. ..	9,000	— [11]	N	—	—	

Remarks:

[2] For radiotelegrams sent by or addressed to the commander of a ship relating to the service of the ship the coast tax is reduced to fcs. 0.25 per word. The preamble of such messages should contain the service instruction S B

[3] Cape Sable and Sable Island communicate with the land telegraph system through Camperdown The retransmission charge between these stations and Camperdown is fcs. 0.30 per word. This charge is additional to the ordinary radio and land line rates

[4] Atlantic standard time, 4 hours later than Greenwich time

[5] For radiotelegrams sent from or addressed to ships engaged in the local service between Victoria, Vancouver and Seattle, the coast charge is fcs. 0.15 per word. The preamble of such radiotelegrams should contain the service instruction F B

[6] Independent direction finding station

[7] Pacific standard time, 8 hours later than Greenwich time

Gonzales Hill ..	British Columbia, Victoria 48° 24′ 50″ N. 123° 19′ 23″ W.	VAK	250	Government, Naval	300, 600	P G[1] ..	N	0.60[10]	—	[8] The station is open only during the season of navigation, approximately April to December [9] Acts as a retransmitting station for Port Nelson, Manitoba [10] With the wave-length of 1,800 metres [11] Transatlantic commercial traffic. Communicates with Clifden (United Kingdom)
Grindstone Island ..	Gulf of St. Lawrence, Magdalen Islands 47° 23′ 00″ N. 61° 54′ 20″ W.	VCN	200	Marconi Co. ..	300, 600	P G[1] ..	0800 to 2000[6]	0.30	—	
Grosse Isle, Quebec..	47° 02′ 00″ N. 70° 40′ 05″ W.	VCD	100	Marconi Co. ..	300, 600	P G[1] ..	N	0.15	—	
Halifax Dockyard ..	Nova Scotia 44° 39′ 30″ N. 63° 35′ 10″ W.	VAA	—	Government ..	—	O ..	—	—	—	
Harrington, Quebec	50° 29′ 39″ N. 59° 27′ 45″ W.	VCJ	150	Marconi Co. ..	300, 600	P G[1] ..	N[8]	0.30	—	
Heath Point.. ..	Anticosti Island 49° 05′ 20″ N. 61° 42′ 16″ W.	VCI	250	Marconi Co. ..	300, 600	P G[1] ..	N[8]	0.30	—	
Ikeda Head	British Columbia (Moresby Island) 52° 17′ 11″ N. 131° 07′ 34″ W.	VAI	250	Government, Naval	300, 600	P G[1] ..	0800 to 0000[7]	0.60[8]	—	
Kingston, Ontario ..	44° 14′ 04″ N. 76° 27′ 30″ W.	VBH	350	Marconi Co. ..	300, 600, 1,600	P G[1] ..	N	0.15	—	
Le Pas, Manitoba ..	53° 52′ 45″ N. 101° 21′ 30″ W.	VBM	600	Government ..	900, 1,800, 2,400	O[9] ..	X	—	—	
Lurcher Lightship ..	Nova Scotia 43° 49′ 32″ N. 66° 32′ 00″ W.	VDR	100	Department of Marine	300	O ..	X	—	—	
Midland, Ontario ..	44° 44′ 20″ N. 79° 51′ 35″ W.	VBC	350	Marconi Co. ..	300, 600, 1,600	P G[1] ..	N	0.15	—	
Montreal	Quebec 45° 32′ 43″ N. 73° 31′ 46″ W.	VCA	350	Marconi Co. ..	300, 600	P G[1] ..	N[8]	0.15	—	
Newcastle	New Brunswick	VAN	—	—	—	P	—	—	—	
North Sydney, Nova Scotia	Cape Breton Island 46° 13′ 29″ N. 60° 14′ 33″ W.	VCO	100	Marconi Co. ..	300, 600	P G[1] ..	N	0.30	—	
Pachena	Vancouver Island 48° 43′ 40″ N. 125° 06′ 20″ W.	VAD	500	Government, Naval	300, 600	P G[1] ..	N	0.60[8]	—	
Partridge Island ..	New Brunswick, St. John 45° 14′ 03″ N. 66° 03′ 05″ W.	VCV	250	Marconi Co. ..	300, 600	P G[1] ..	N	0.30	—	
Pictou, Nova Scotia	Northumberland Strait 45° 41′ 01″ N. 62° 42′ 21″ W.	VCQ	100	Marconi Co. ..	300, 600	P G[1] ..	Dec. to April, N May to November —	0.15	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
CANADA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Point Edward ..	Ontario 43° 00′ 09″ N. 82° 24′ 53″ W.	VBE	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Point Grey	British Columbia, near Vancouver. 49° 15′ 57″ N. 123° 15′ 22″ W.	VAB	150	Government, Naval	300, **600**	P G[1] ..	N	0.60[2,5]	—	
Port Arthur, Ontario	48° 26′ 49″ N. 89° 13′ 45″ W.	VBA	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Port Burwell ..	Ontario 42° 38′ 35″ N. 80° 47′ 14″ W.	VBF	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Port Nelson, Manitoba	Hudson Bay 57° 03′ 19″ N. 92° 44′ 27″ W.	VBN	150 600[10]	Government ..	300, **600**, 1,800	P G ..	N	0.60	—	
Quebec	46° 48′ 24″ N. 71° 12′ 26″ W.	VCC	100	Marconi Co. ..	300, **600**	P G[1] ..	N	0.15	—	
Sable Island ..	43° 56′ 18″ N. 60° 19′ 00″ W.	VCT	300	Marconi Co. ..	300, **600**	P G[1,3] ..	N	0.85[8]	—	
Saulte Ste. Marie, Ontario	46° 31′ 05″ N. 84° 17′ 50″ W.	VBB	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Three Rivers, Quebec	46° 20′ 45″ N. 72° 33′ 25″ W.	VCB	150	Marconi Co. ..	300, **600**	P G[1] ..	N[9]	0.15	—	
Tobermory, Ontario	45° 15′ 57″ N. 81° 39′ 40″ W.	VBD	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Toronto VBG ..	43° 36′ 50″ N. 79° 22′ 53″ W.	VBG	350	Marconi Co. ..	300, **600**, 1,600	P G[1] ..	N	0.15	—	
Triangle Island ..	British Columbia 50° 51′ 48″ N. 129° 04′ 50″ W.	VAG	450	Government, Naval	300, **600**	P G[1] ..	N	0.60[8]	—	
CAPE VERDE ISLANDS										
St. Vincente Island[1] (Mindello)	16° 54′ 00″ N. 24° 59′ 00″ W.	—	—	—	600, 1,000, 1,200, 1,600, 3,000	—	—	—	—	[1] Under construction
St. Thiago Island[1] (Praia)	15° 00′ 00″ N. 23° 40′ 00″ W.	—	—	—	600, 1,000, 1,600	—	—	—	—	
Sal Island[1]	16° 49′ 00″ N. 22° 56′ 00″ W.	—	—	—	300, 600, 1,000	—	—	—	—	
Boa Vista Island[1] ..	16° 05′ 00″ N. 22° 50′ 00″ W.	—	—	—	300, 600, 1,000	—	—	—	—	

CEYLON										
Colombo Radio ..	6° 55′ 00″ N. 79° 53′ 00″ E.	VPB	390	Government ..	300, **600**	P G ..	N	0.60	—	
Matara	5° 59′ 00″ N. 80° 32′ 00″ E.	BZE	1,000	**British Admiralty**	600 (spark) 4,000 (arc)	P G, O ..	—	0.60	—	
CHILI							Chilian Standard Time[2]			
Ancud	41° 52′ 00″ S. 73° 52′ 00″ W.	—	—	Government ..	—	—	—	—	—	[1] The long wave is used for inland correspondence [2] Four hours later than Greenwich time [3] The station is open for inland correspondence [4] The station transmits a weather report at 04.00 and a time signal at 1300 (Greenwich time). (For full particulars see International Time and Weather Signals—Chile.) [5] For reception [6] For transmission
Antofagasta ..	23° 27′ 35″ S. 70° 31′ 30″ W.	CCB	400	Government ..	300, **600**, 1,300[1]	P G ..	N	0.60	6.00	
Arica	18° 29′ 00″ S. 70° 20′ 35″ W.	CCA	400	Government ..	**600**, 1,300[1]	O ..	—	—	—	
Coquimbo	29° 57′ 35″ S. 71° 20′ 00″ W.	CCO	400	Government ..	**600**, 1,300[1]	P G ..	—	0.60	6.00	
Evangelistas ..	52° 47′ 00″ S. 74° 50′ 00″ W.	CCZ	—	Government ..	—	—	—	—	—	
Huafo	Huafo Island 43° 33′ 37″ S. 74° 49′ 30″ W.	CCH	250	Government ..	**600**, 900[1]	P R ..	0900 to 1100 1400 to 1600 2100 to 2300	0.60	6.00	
Juan Fernandez ..	Juan Fernandez Island 33° 37′ 30″ S. 78° 49′ 50″ W.	CCJ	250	Government ..	**600**, 1,600	P R ..	0900 to 1100 1400 to 1600 2100 to 2300	0.60	6.00	
Llanquihue	41° 32′ 00″ S. 72° 55′ 00″ W.	CCL	2,000	Government ..	**3,500**, 500	—[3]	—	—	—	
Mocha	Island of Mocha 38° 12′ 22″ S. 73° 53′ 44″ W.	CCM	300	Government ..	600	P R ..	1000 to 1200 1600 to 1800	0.60	6.00	
Punta Arenas ..	53° 10′ 00″ S. 70° 50′ 00″ W.	CCP	2,000	Government ..	**3,500**, 500	—[3]	—	—	—	
Raper	Peninsula of Taytao 46° 49′ 45″ S. 75° 37′ 30″ W.	CCR	250	Government ..	**600**, 1,600	P R ..	0900 to 1100 1400 to 1600 2100 to 2300	0.60	6.00	
Talcahuano	36° 44′ 00″ S. 73° 05′ 35″ W.	CCT	700	Government ..	300, **600**, 1,300[1]	P G ..	0800 to 0000[5] 1000 to 1100[6] 1600 to 1800[6]	0.60	6.00	
Valparaiso	33° 01′ 06″ S. 71° 38′ 06″ W.	CCV	300	Government, Naval	300, **600**, 1,300[1]	P G[4] ..	N	0.60	6.00	
CHINA										
Canton	23° 10′ 00″ N. 113° 20′ 00″ E.	XNP	650	Government ..	600, 1,200, **1,600**, 2,100	P G[1] ..	0800 to 2200[2]	0.50[5]	—	[1] Communicates with other coast stations in China [2] Time of the east coast of China (8 hours in advance of Greenwich time)
Foochow	26° 07′ 00″ N. 119° 18′ 00″ E.	XOW	650	Government ..	600, 1,200 **1,600**, 2,100	P G[1] ..	0800 to 2200[2]	0.50[6]	—	
Kalgan	Chihli 40° 45′ 00″ N. 115° 20′ 00″ E.	XQL	650	Government ..	1,200, **1,600**, 2,100, 3,000	O ..	N	—	—	
Kashgar[5]	Sinkiang, Eastern Turkestan	—	—	Government ..	—	—	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
CHINA—*cont'd.*	Meridian of Greenwich.							Francs.	Francs.	[3] In the case of messages originating at or intended for Canton or Shameen, the local land line charge is included in the coast tax [4] In the case of messages originating at or intended for Foochow the local land line charge is included in the coast tax [5] Under construction [6] No charge for relaying messages [7] Operated by the United States Naval Communication Service, Radio Virginia, U.S.A. [8] In the case of messages originating at or intended for Shanghai or Woosung (Kiangsu), the local land line charge is included in the coast tax [9] The station transmits a time signal (see International Time and Weather Signals—China) [10] Seventh time belt east of the Greenwich belt
Lan-Chau-Fu [5] ..	Kansu	—	—	Government ..	—	—	—	—	—	
Pekin NPP [7] ..	39° 54′ 50″ N. 116° 30′ 20″ E.	NPP	150	U.S. Navy ..	300, **600**	O ..	N	—[6]	—[6]	
Pekin XPK	39° 54′ 00″ N. 116° 27′ 00″ E.	XPK	650	Government ..	600, 1,200, **1,600**, 2,100	O ..	N	—	—	
Quang-Tchéou-Wan	21° 03′ 34″ N. 110° 27′ 45″ E.	FWA	500	French Government	300, **600**, 1,800	P G, O ..	0700 to 1100[10] 1400 to 1700	0.25	2.00	
Shanghai	31° 15′ 00″ N. 121° 29′ 00″ E.	XSH	200	Government ..	600	P G[1] ..	0800 to 2200[9]	0.50[8]	—	
Shanghai-Zikawei ..	31° 11′ 32″ N. 121° 25′ 48″ E.	FFZ	500	Soc. Française Radio-électrique (of Paris)	600, **1,000**, 1,800	P G[4] ..	N	0.50	—	
Sianfu [5]	Shensi	—	—	Government ..	—	—	—	—	—	
Urumchi [5]	Sinkiang	—	—	Government ..	—	—	—	—	—	
Woosung, Kiangsu ..	31° 21′ 00″ N. 121° 25′ 00″ E.	XSG	650	Government ..	600, 1,200, **1,600**, 2,100	P G[1] ..	N	0.50[8]	—	
Wuchang	Hupeh 30° 30′ 00″ N. 114° 23′ 00″ E.	XOC	650	Government ..	600, 1,200, **1,600**, 2,100, 3,000	O ..	0800 to 2200[9]	—	—	
COCHIN CHINA										
Cap Saint-Jacques ..	To the south-east of Saigon 10° 20′ 00″ N. 107° 05′ 14″ E.	FCA	250	Government ..	300, **600**	P G, O ..	0700 to 1100[1] 1400 to 1700	0.25	2.00	[1] Seventh time belt east of the Greenwich belt
Luang-Prabang [2] ..	19° 50′ 00″ N. 102° 07′ 00″ E.	—	—	—	—	—	—	—	—	[2] Under construction
Vientiane [2]	Laos	—	—	—	—	—	—	—	—	

COCOS KEELING ISLANDS										
Cocos ..	Indian Ocean 12° 05′ 24″ S. 96° 53′ 20″ E.	VPK	150	Eastern Extension Australasia and China Telegraph Co.	800, 600	P G ..	N	0.60	—	
COLOMBIA										
Baranquilla [1] ..	10° 56′ 00″ N. 74° 46′ 00″ W.	—	—	—	—	—	—	—	—	[1] Under construction
Bogota [1]	4° 35′ 00″ N. 74° 12′ 00″ W.	—	—	—	—	—	—	—	—	
Cali [1]	3° 25′ 00″ N. 76° 45′ 00″ W.	—	—	—	—	—	—	—	—	
Cartagena, Rep. Colombia	10° 40′ 00″ N. 75° 30′ 00″ W.	CTG	600	Ges. für Drahtlose Tel.	**600, 1,500,** 2,000, 2,500, 3,000	P G ..	0600 to 0000	0.50	—	
Cucuta [1]	7° 28′ 00″ N. 72° 42′ 00″ W.	—	—	—	—	—	—	—	—	
Medellin [1]	6° 02′ 00″ N. 75° 50′ 00″ W.	—	—	—	—	—	—	—	—	
Puerto Colombia [1] ..	11° 02′ 00″ N. 75° 00′ 00″ W.	—	—	—	600, 1,800	—	—	—	—	
Santa Marta	—	UCJ	—	United Fruit Co.	—	P G ..	—	0.60	—	
San Andreas [1] ..	Caribbean Sea	—	—	Government ..	**600,** 1,800	—	—	—	—	
COMORO ISLANDS							Third time belt E. of the Greenwich belt.			
Dzaoudzi	Mayotta Island 12° 46′ 55″ S. 45° 16′ 29″ E.	FDO	430	French Government	300, **600**	P G[1] [2] ..	0700 to 1100 1330 to 1700 1900 to 2100	0.50	—	[1] The station also communicates by radiotelegraphy with Majunga [2] Messages giving warning of cyclones are transmitted by this station. (See International Time and Weather Signals.)
Mutsamudu	Johanna 12° 09′ 26″ S. 44° 24′ 27″ E.	FLU	100	French Government	600	P G ..	0700 to 1100 1330 to 1700	0.50	—	
COOK (or Harvey) ISLANDS										
Rarotonga	—	VMR	—	Government ..	—	P G ..	—	0.60	—	
COSTA RICA										
Limon	—	X	—	United Fruit Co.	—	P G ..	—	0.60	—	
CUBA										
Baracoa	—	B	—	Government ..	—	P G ..	—	0.40	—	[1] The working of the station is temporarily suspended
Camaguey [1]	—	C	—	Government ..	—	P G ..	—	0.40	—	
Cayo Cristo	—	CO	—	Government ..	—	P G ..	—	0.40	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
CUBA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Guantanamo Bay[2]	South Coast of Cuba 19° 54′ 00″ N. 75° 08′ 30″ W.	NAW	200 1,500[4]	U.S. Navy ..	300, **600**, 4,000[4]	P G[3] ..	N	0.30	—	[2] Operated by the United States Naval Communication Service, Radio Virginia [3] Public correspondence also exchanged with San Domingo (Dominican Republic) [4] Long-distance special correspondence on this wave-length
Maniti	—	NMB	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Morro Castle.. ..	Havana	M	—	Government ..	—	P G ..	—	0.40	—	
Nueva Gerona ..	Isla de Pinos	P	500-600	Government ..	—	P G ..	—	0.40	—	
Pinar del Rio ..	—	R	—	Government ..	—	P G ..	—	0.40	—	
Santa Clara	—	DA	—	Government ..	—	P G ..	—	0.40	—	
Santiago de Cuba ..	—	SN	—	Government ..	—	P G ..	—	0.40	—	
CURACAO										
Aruba	Dutch West Indies 12° 31′ 05″ N. 70° 02′ 01″ W.	PJA	108	Government ..	**600**	—[1]	Local time. 0900 to 1100 1400 to 1600 Sundays and holidays 1145 to 1245	0.60	—	[1] The station exchanges public correspondence with Curaçao [2] The station also exchanges correspondence with Aruba and Bonaire
Bonaire, Ile	Dutch West Indies 12° 09′ 20″ N. 68° 16′ 15″ W.	PJB	108	Government ..	**600**	—[1]	0900 to 1100 1400 to 1600 Sundays and holidays 1145 to 1245	0.60	—	
Curaçao	Dutch West Indies 12° 06′ 20″ N. 68° 56′ 35″ W.	PJC	400	Government ..	300, **600**, 1,800	P G[2] ..	N	0.60	—	
DENMARK							Central European Time.[1]			
Blaavand Radio ..	North Sea Coast 55° 33′ 29″ N. 8° 05′ 11″ E.	OXB	200	Government ..	300, **600**	P G ..	N	0.30	3.00	[1] One hour in advance of Greenwich time [2] Lighthouse [3] Communicates with ships in case of distress only
Copenhagen Radio ..	55° 41′ 13″ N. 12° 34′ 40″ E.	OXA	200	Government ..	300, **600**	P G ..	N	0.30	3.00	
Drogden[2]	The Sound 55° 33′ 02″ N. 12° 42′ 00″ E.	OUW	15	Government ..	300	—[3]	N	—	—	

Gjedser	Falster Island 54° 34′ 23″ N. 11° 55′ 50″ E.	OXC	135	State Railways of Denmark ..	300, **450**, 600, 800, 1,000	O [4] ..	0600 to 2000	—	—	Official correspondence with the Danish ferry boats of the Gjedser-Warnemünde line, concerning railway traffic
Gjedser Havn ..	Falster Island 54° 32′ 04″ N. 11° 56′ 03″ E.	OXD	25	State Railways of Denmark	250	—[3]	In general, N	—	—	
Graadyb [3]	North Sea 55° 21′ 07″ N. 8° 07′ 07″ E.	OUX	30	Government ..	200	—[3]	N	—	—	
Horns Rev [3] ..	North Sea 55° 34′ 01″ N. 7° 19′ 05″ E.	OUZ	30	Government ..	200	—	N	—	—	
Vyl [3]	North Sea 55° 23′ 06″ N. 7° 45′ 09″ E.	OUY	30	Government ..	200		N	—	—	
DOMINICAN REPUBLIC										
La Romana.. ..	18° 25′ 00″ N. 68° 57′ 20″ W.	HIB	200–250	Guanica Centrale	300, **600**, 1,600	P G [1] ..	Local Time. 0800 to 1200 1400 to 1700	0.60 [2] 0.30 [3]	—	[1] La Romana and San Domingo also communicate with each other by wireless. Charge per word: fr. 0.40 without minimum. This charge is reduced to fr. 0.20 for telegrams sent on the service of the San Domingo Government [2] For ordinary radiotelegrams [3] For radiotelegrams sent on the service of the San Domingo Government [4] Public correspondence is also exchanged with Guantanamo Bay (Cuba)
Santo Domingo ..	18° 25′ 00″ N. 69° 53′ 21″ W.	HIA	250	Government ..	300, 600, 1,600	P G [1] ..	0800 to 1200 1400 to 1700	0.60 [2] 0.30 [3]	—	
San Domingo City ..	—	NJG	—	U.S. Navy ..	300, **600**	P G [4] ..	N	0.30	—	
DUTCH EAST INDIES										
Amboina Radio ..	Amboina Island 3° 46′ 40″ S. 128° 06′ 00″ E.	PKE	420	Government ..	**600**, 1,600 2,300	P G ..	Java Mean Time.[1] Weekdays: 0700 to 0800 1330 to 1900 Sundays: 1330 to 1900	0.40	4.00	[1] Mean time of the Island of Java, 109° 48′ 37.05″ E. of Greenwich. [2] The station communicates only with the steamers of the following companies: Java-China-Japan Line; Java-Pacific Line, Anglo-Saxon Petroleum Co., Koninklijke
Balikpapan Radio ..	Borneo 1° 16′ 10″ S. 116° 51′ 00″ E.	PKF	150	Batavia Petroleum Co.	**600**, 3,375	P R [2] ..	0910 1430 to 1530 1600 to 1630	0.40	4.00	
Dilli [3]	Timor 8° 33′ 00″ S. 125° 35′ 00″ E.	—	—	—	600, 1,200, 1,600, 2,400	—	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
DUTCH EAST INDIES —*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Koepang Radio	Timor 10° 00′ 30″ S. 123° 36′ 50″ E.	PKD	420	Government ..	**600**, 1,600, 2,300	P G ..	Weekdays: 0700 to 0800 1330 to 1900 Sundays: 1330 to 1900	0.40	4.00	Steam Packet Co., Rotterdam-Lloyd, Netherland Steamship Co., Dutch Indies Tank Steamer Co., La Coroña Petroleum Co., Zeelandia Sealighter Co., Batavia Petroleum Co. [3] Under construction
Sabang Radio ..	Sumatra, Weh Island 5° 54′ 00″ N. 95° 20′ 06″ E.	PKA	400	Government ..	600	P G ..	N	0.40	4.00	
Siteobondo Radio ..	Java 7° 41′ 00″ S. 114° 05′ 30″ E.	PKC	420	Government ..	**600**, 1,600, 2,300	P G ..	Weekdays: 0700 to 0800 1330 to 1900 Sundays: 1330 to 1900	0.40	4.00	
Tarakan	Island of Tarakan 3° 18′ 14″ N. 117° 36′ 12″ E.	PKG	150	Batavia Petroleum Co.	**600**, 2,955	P R[3] ..	0910 1430 to 1530 1600 to 1630	0.40	4.00	
Weltevreden Radio	Near Batavia 6° 09′ 40″ S. 106° 50′ 20″ E.	PKB	270	Government Marine Dept.	600	P G, O	0700 to 2200 Sundays and holidays: 0900 to 1300	0.40	4.00	
ECUADOR										
Esmeraldas[1] ..	—	—	—	—	1,800	—	—	—	—	[1] Under construction
Guayaquil	—	GPH	—	Captain of the port (Captain Chambers)	—	P ..	—	—	—	
Guayaquil[1]	—	—	—	—	1,800	—	—	—	—	
Quito[1]	—	—	—	—	1,800	—	—	—	—	
Santa Elena Point[1] ..	—	—	—	—	—	—	—	—	—	
EGYPT										
Abu Zabal	Near Cairo 30° 02′ 00″ N. 31° 16′ 00″ E.	SUC	—	British Admiralty	4,500, 5,400 (spark) 5,800, 7,400 cw.	—	Time.[1] —	—	—	[1] Eastern European time, 2 hours in advance of Greenwich time [2] The handling of public correspondence temporarily suspended
Alexandria	—	SUH	450	—	—	P G ..	N	—	—	

Station	Position	Call sign	Range	Owner	Wave lengths	Nature of service	Hours	Coast tax	Land tax	Remarks
Port Said	31° 14′ 00″ N. 32° 19′ 00″ E.	SUB	350	Lloyds	300, 600	P G[3] ..	N	0.60	—	[3] Continuous service is performed provisionally
Port Sudan	19° 37′ 05″ N. 37° 12′ 55″ E.	SUD	250	Sudan Government	300, 600	P G ..	0700 to 1300[5] 1700 to 2300	0.60[4]	—	[4] In the case of messages originating at or intended for Port Sudan, the local land line charge is included in the coast tax
ERITREA										
Asmara	15° 20′ 00″ N. 38° 30′ 00″ E.	ICW	—	Italian Government	—	—	—	—	—	[1] Open for public correspondence direct with the Rome (S. Paulo) station
Assab Radio.. ..	12° 59′ 40″ N. 42° 44′ 00″ E.	ICY	160	Italian Government	600, 2,300, 3,900	P G	—[3]	—	—	[2] Communicates also with Mogadiscio ISG
Massaua Radio ..	Red Sea 15° 36′ 30″ N. 39° 28′ 52″ E.	ICX	1,600	Italian Government	4,000	P G[1 2]	X	—	—	[3] 0130–0230, 0630-0730, 0930–1200, 1330–1600, 1730–1830, 2100–2200
FALKLAND ISLANDS										
Falkland Islands ..	51° 41′ 00″ S. 57° 55′ 00″ W.	BZN	—	British Admiralty	—	P G ..	Local Time.[1] —	0.60	—	[1] Local time, 3 hours 55 minutes later than Greenwich time
Port Stanley.. ..	51° 41′ 15″ S. 57° 49′ 15″ W.	VPC	650	Colonial Government	300, 600	P G ..	0900 to 1200 2100 to 0000	0.60[2]	—	[2] In the case of messages originating at or intended for Falkland Islands the local land line charge is included in the coast tax
FAROE ISLANDS										
Thorshavn	Island of Stromo 62° 00′ 52″ N. 6° 46′ 00″ W.	OXJ	100	Great Northern Telegraph Co.	300, 500, 600	P G[1] ..	—[3]	0.15	—	[1] The station also communicates with Tvaeraa
Tvaeraa	Island of Sudero 61° 33′ 12″ N. 6° 48′ 00″ E.	OXK	—	—	300, 500, 600	—[2]	—	—	—	[2] The station only communicates with Thorshavn [3] The station is open weekdays: 0800 to 2100 (2130 from June 1 to Aug. 31). Sundays and holidays: 1100 to 1300 and 1700 to 2000. However, with the exception of the first ten minutes of each of these hours it communicates with ships only if not occupied in communication with Tvaeraa

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
FERNANDO PO										
Santa Isabel de Fernando Póo	3° 46′ 00″ N. 8° 48′ 40″ E.	EAY	130	Government ..	300, **600**, 1,800	P G ..	Local Time. 0600 to 0900 1900 to 2200	0.55[1]	5.50[1]	[1] In the case of messages destined to the island of Fernando Po, the charge for delivery to destination is included in the coast charge; and, moreover, the minimum charge is not applicable to these messages destined to the island
FIJI ISLANDS							Fiji Islands Time.[1]			[1] Twelve hours in advance of Greenwich time [2] The station also communicates by wireless with other stations in the Fiji Islands. The charge for the transmission of messages between two coast stations in the islands is fr. 0.30 per word. In addition the station exchanges meteorological telegrams with ships in stormy weather [3] The working hours are as follows: Weekdays: 1000—to clear traffic; 1200—to clear traffic; 1500—to clear traffic Saturdays as above, omitting the watch at 1500 [4] The working hours are as follows: Weekdays: 1000—to clear traffic; 1205—to clear traffic; 1500—to clear traffic; 2000 to 0000 continuous Saturdays as above, omitting the watch at 1500 Sundays, 2000 to 0000 only
Labasa	16° 26′ 00″ S. 179° 24′ 00″ E.	VPE	300	Government ..	300, **600**	P G[2] ..	—[3]	0.60	—	
Savu Savu	Vanua Levu 16° 47′ 00″ S. 179° 24′ 00″ E.	VCL	—	Government ..	—	—	—	—	—	
Suva	Viti Levu 18° 08′ 55″ S. 178° 27′ 30″ E.	VPD	300	Government ..	300, **600**	P G[2] ..	—[4]	0.60	—	
Taveuni	16° 46′ 30″ S. 179° 59′ 15″ E.	VPF	200	Government ..	300, **600**	P G[2] ..	—[3]	0.60	—	

FINLAND										
Sandhamm[1] ..	Near Helsingfors	—	—	—	—	—	—	—	—	[1] Under construction
FRANCE										
Ajaccio-Aspretto ..	Corsica 41° 55′ 31″ N. 8° 45′ 36″ E.	FUI	—	Navy	—	O ..	Greenwich Time. 0700 to 2200	—	—	
Barre de L'Adour[2]	43° 31′ 40″ N. 1° 31′ 20″ W.	FLO	—	Navy	—	D F ..	—	—	—	
Bernières[2]	49° 20′ 00″ N. 0° 25′ 00″ W.	UHN	—	Navy	—	D F ..	—	—	—	
Bonifacio T.S.F. ..	Strait of Bonifacio 41° 23′ 15″ N. 9° 12′ 00″ E.	FFC	300	Postal, Telegraph and Telephone Administration	300, 600	P G ..	N	0.40[1]	—	
Bordeaux T.S.F. ..	44° 52′ 21″ N. 0° 37′ 12″ W.	FFX	200	Postal, Telegraph, and Telephone Administration	300, 600	P G ..	N	0.40	—	
Boulogne-sur-Mer T.S.F.	50° 43′ 00″ N. 1° 37′ 00″ E.	FFB	200	Postal, Telegraph, and Telephone Administration	300, 600	P G ..	N	0.40[3]	—	
Brest-Guipavas[2] ..	48° 27′ 00″ N. 4° 26′ 30″ W.	FHA	—	Navy	—	D F ..	—	—	—	
Brest-Capucins[4] ..	48° 19′ 12″ N. 4° 34′ 48″ W.	HUD	—	Navy	—	D F[4] ..	—	—	—	
Calais	50° 58′ 00″ N. 1° 51′ 00″ E.	FUL	—	Navy	—	O ..	—	—	—	
Cherbourg-Rouges-Terres[5]	49° 36′ 32″ N. 1° 36′ 00″ W.	FUC	—	Navy	—	O, D F..	0700 to 2200	—	—	
Craix d'Hinge[10] ..	Near Bordeaux	—	—	—	—	—	—	—	—	
Dieppe	49° 55′ 30″ N. 1° 04′ 30″ E.	FFI	100	State Railway Administration	400	P[7] ..	1000 to 1400 2030 to 2330	—	—	
Dunkerque Castelnau	51° 00′ 30″ N. 2° 23′ 15″ E.	FUD	—	Navy	—	O ..	0700 to 2200	—	—	
Eiffel Tower, Paris ..	48° 51′ 30″ N. 2° 18′ 00″ E.	FL	—	Army	2,500	—[8]	—	—	—	
Havre T.S.F. (Le)[6]..	49° 31′ 30″ N. 0° 07′ 00″ E.	FFH	200	Postal, Telegraph, and Telephone Administration	300, 600	P G, D F	N	0.40[3]	—	
Lorient-Pen-Mané ..	47° 44′ 00″ N. 3° 21′ 00″ W.	FUN	—	Navy	—	O ..	0700 to 2200	—	—	
Lyons	45° 41′ 00″ N. 4° 47′ 00″ E.	YN	—	—	15,000 (cw.)	—[9]	—	—	—	
Marseille T.S.F. ..	43° 19′ 00″ N. 5° 21′ 00″ E.	FFM	200	Postal, Telegraph, and Telephone Administration	600	P G ..	N	0.40[1]	—	
Mengam	48° 22′ 00″ N. 4° 34′ 00″ W.	FUE	—	Navy	—	O ..	0700 to 2200	—	—	
Nantes	—	UA	—	—	11,000	—	—	—	—	
Nice T.S.F.	43° 39′ 00″ N. 7° 10′ 00″ E.	FFN	200	Postal, Telegraph, and Telephone Administration	300, 600	P G ..	N	0.40[1]	—	

[1] The coast charge is reduced to fr. 0.15 per word for ships whose regular service is between France on the one hand and Corsica, Algeria, and Tunis on the other.

[2] Direction finding station

[3] The coast charge is reduced to fr. 0.15 per word for correspondence with ships whose home ports are on the coast of the English Channel and the Straits of Dover, and which are engaged in a regular service between France and England

[4] Direction finding station, all transmission is made by Mengam FUE

[5] This station is also open for direction finding service

[6] Direction finding station, all transmission is made by Ouessant T.S.F. FFU

[7] Special correspondence in connection with the marine business of the ships employed on the service between Dieppe and Newhaven

[8] Transmits daily a time signal and meteorological message. (See International Time and Weather Signals)

[9] Transmits daily a time signal. (See International Time and Weather Signals)

[10] Under construction

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
FRANCE—*contd.*	Meridian of Greenwich.						Greenwich Time.	Francs.	Francs.	
Ouessant T.S.F. ..	Ushant Island 48° 27′ 05″ N. 5° 05′ 00″ W.	FFU	400	Postal, Telegraph, and Telephone Administration	300, **600**	P G ..	N	0.40	—	
Ouessant-Pen ar Roch[4]	48° 26′ 27″ N. 5° 05′ 33″ W.	FHY	—	Navy	—	D F[4] ..	—	—	—	
Pointe du Raz[3] ..	48° 02′ 22″ N. 4° 43′ 52″ W.	FPU	—	Navy	—	D F ..	—	—	—	
Porquerolles ..	Hyeres Islands 42° 59′ 00″ N. 6° 12′ 00″ E.	FUQ	—	Navy	—	O ..	0700 to 2200	—	—	
Rochefort-sur-Mer ..	45° 55′ 30″ N. 0° 57′ 00″ W.	FUR	—	Navy	—	O ..	0700 to 2200	—	—	
Rochefort-Soubise[3] ..	45° 56′ 00″ N. 1° 00′ 00″ W.	HOB	—	Navy	—	D F ..	—	—	—	
S. Maries de la Mer T.S.F.	Gulf of Lions 43° 27′ 00″ N. 4° 26′ 00″ E.	FFS	400	Postal, Telegraph, and Telephone Administration	300, **600**	P G ..	N	0.40[1]	—	
Toulon Croix des Signaux	43° 04′ 45″ N. 5° 56′ 05″ E.	FUX	100	Navy	—	O ..	0700 to 2200	—	—	
Toulon-Mourillon ..	43° 07′ 00″ N. 5° 55′ 00″ E.	FUT	—	Navy	—	O ..	0900 to 0000	—	—	
Tréguier[3]	48° 50′ 08″ N. 3° 13′ 56″ W.	FOC	—	Navy	—	D F ..	—	—	—	
FRENCH EQUATORIAL AFRICA							Time.[1]			
Bangui[3]	—	—	—	—	—	—	—	—	—	[1] One hour in advance of Greenwich time [2] Continuous service during the voyages of the regular steamers [3] Under construction
Brazzaville[3] ..	4° 28′ 00″ S. 15° 13′ 00″ E.	—	—	—	—	—	—	—	—	
Loango	Congo, Pointe Noire 4° 46′ 49″ S. 11° 13′ 02″ E.	UAW	275	Government ..	300, **600**, 1,800	P G ..	0800 to 1030[2] 1400 to 1630[2]	—	—	
FRENCH GUIANA										
Cayenne[1]	4° 50′ 00″ N. 52° 20′ 00″ W.	—	—	—	—	—	—	—	—	[1] Under construction

FRENCH SOMALILAND										
Djibouti	—	FJJ	—	Government ..	—	P G ..	—	0.30	—	
FRENCH WEST AFRICA										[1] Interior station [2] The station is open for public correspondence in the inland service [3] This station connects with the International Telegraph System through Port Etienne and Rufisque [4] The station connects with the inland telegraph system through the Rufisque station [5] The Rufisque station communicates with the interior. It only communicates with ships in the case of the interruption of the Dakar station. It then uses the 600-metre wave-length. [6] Under construction
Agades [6]	—	—	—	—	—	—	—	—	—	
Atar [1]	Mauritania	—	—	Government ..	—	P G [2,3] ..	—	—	—	
Bamako [6]	12° 40′ 00″ N. 7° 50′ 00″ W.	—	—	—	—	—	—	—	—	
Bilma [6]	—	—	—	—	—	—	—	—	—	
Chinguetti [1]	Mauritania	—	—	Government ..	—	P G [2,3] ..	—	—	—	
Conakry	Guinea 9° 30′ 59″ N. 13° 42′ 46″ W.	FCO	400	Government ..	**600**, 2,000	P G ..	Sunrise to sunset	0.30	—	
Dakar	Senegal 14° 40′ 27″ N. 17° 25′ 22″ W.	FDA	600	Government ..	**600**	P G [5] ..	N	0.30	—	
Port-Etienne ..	Mauritania, Bay of Lévrier 20° 55′ 39″ N. 17° 03′ 01″ W.	FPE	400	Government ..	**600**	P G [4] ..	Sunrise to sunset	0.30	—	
Rufisque	Senegal 14° 43′ 04″ N. 17° 16′ 23″ W.	FRU	500	Government ..	600, **2,000**	P G [5] ..	Sunrise to sunset	0.30	—	
Tabou	Ivory Coast 4° 25′ 19″ N. 7° 22′ 27″ W.	FTA	400	Government ..	**600**	P G ..	Sunrise to sunset	0.30	—	
Timbuctu [6]	16° 38′ 00″ N. 2° 40′ 00″ W.	—	—	—	—	—	—	—	—	
GAMBIA (West Africa)										[1] Other wave-lengths are used for official correspondence
Bathurst	13° 28′ 00″ N. 16° 35′ 00″ W.	BZK	1,000	British Admiralty	**600** [1]–2,000 (spark) 4,000 (arc)	O, P G ..	—	0.60	—	
GERMANY										[1] Public correspondence restricted to urgent messages relating to navigation. [2] For telegrams of which the only wireless transmission takes place between the lightship and the shore, a fixed charge of 1 fr. per telegram only is collected, in addition to the ordinary charges for transmission over the land lines
Adlergrund Lightship	Baltic Sea 54° 49′ 59″ N. 14° 22′ 12″ E.	KAG	55	Government ..	300	P R [1,2] ..	N	0.37.5 [2]	3.75 [2]	
Amrumbank Lightship	North Sea 54° 33′ 12″ N. 7° 53′ 12″ E.	KAF	27	Government ..	**300**, 600	P R [1,2] ..	N	0.37.5 [2]	3.75 [2]	
Aussenjade Lightship	North Sea 53° 51′ 30″ N. 7° 56′ 40″ E.	KAU	55	Government ..	300	P R ..	N	0.37.5 [2]	3.75 [2]	
Berlin	—	LP	—	Government ..	5,500	—	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
	Meridian of Greenwich.							Francs.	Francs.
GERMANY—*contd.* Borkum New Lighthouse	North Sea 53° 34′ 48″ N. 6° 40′ 12″ E.	KBM	100	Government ..	**800**, 600	P G[3] ..	N	0.37.5	3.75
Borkum Riff Lightship	North Sea 53° 45′ 30″ N. 6° 03′ 30″ E.	KBR	60	Government ..	**800**, 600	P R[1, 2] ..	N	0.37.5[2]	3.75[2]
Bremerhaven Lloydhalle	North Sea Coast 53° 33′ 04″ N. 8° 33′ 08″ E.	KBH	200	Norddeutscher Lloyd Co.	300	P R[4] ..	N	0.37.5	3.75
Bülk	Kiel Bay 54° 27′ 00″ N. 10° 12′ 00″ E.		110	Government ..	300	P G[3, 5] ..	N	0.37.5	3.75
Cuxhaven	North Sea Coast 53° 52′ 27″ N. 8° 42′ 42″ E.	KCX	110	Government ..	300, **600**	P G[3, 6] ..	N	0.37.5	3.75
Danzig	Baltic Coast 54° 20′ 56″ N. 18° 39′ 08″ E.	KAZ	330	Government ..	300, **600**, 1,800	P G[3] ..	0600 to 0000[7]	0.37.5	3.75
Eider Lightship ..	North Sea 54° 16′ 06″ N. 8° 18′ 18″ E.	KAJ	30	Government ..	**800**, 600	P R[1, 2] ..	N	0.37.5[2]	3.75[2]
Eiderlotsengaliote Lightship	North Sea 54° 13′ 30″ N. 8° 37′ 00″ E.	KCL	21	Government ..	**800**, 600	P R[1, 2] ..	N	0.37.5[2]	3.75[2]
Eilvise	—	OUI	—	Government ..	15,000 (cw)	—	—	—	—
Elbe Lightship-Eins	North Sea 54° 00′ 30″ N. 8° 15′ 00″ E.	KBF	60	Government ..	300	PR[1, 2] ..	N	0.37.5[2]	3.75[2]
Heligoland	North Sea 54° 11′ 00″ N. 7° 53′ 00″ E.	KAH	110	Government ..	300	P R[2] ..	N	0.37.5	3.75
Nauen	52° 37′ 00″ N. 12° 51′ 00″ E.	POZ	—	Government ..	5,500 (spk) 12,600 (cw)	—[8]	—	—	—
Norddeich	North Sea Coast 53° 36′ 00″ N. 7° 08′ 00″ E.	KAV	420	Government ..	300, **600**, 1,800	P G[3, 6] ..	N	0.37.5	3.75
Sassnitz	Island of Rügen 54° 30′ 52″ N. 13° 39′ 14″ E.	KCV	110	Prussian Railway Administration	375	P R[9] ..	N	0.37.5	3.75
Swinemünde	Usedom Island 53° 54′ 40″ N. 14° 15′ 13″ E.	KAW	330	Government ..	300, **600**, 1,800	P G[3] ..	0600 to 0000[10]	0.37.5	3.75

Remarks.

[3] At the request of ships a meteorological report is transmitted. The charge per word is 37.5 c.

[4] This station only communicates with the ships of the Norddeutscher Lloyd Co.

[5] Storm warnings directed to the German Baltic coast are transmitted three times on a wave-length of 450 metres as soon as received by the station. They are repeated at 13.00 and 23.00 (Central European time)

[6] In the case of interruption of the Norddeich station storm warnings are transmitted by Cuxhaven as soon as received by that station. They are repeated once at 1300 and 2300.

[7] The station is prepared to receive calls chiefly during the first fifteen minutes of each of its hours of service.

[8] The station transmits a time signal. (For full particulars see International Time and Weather Signals.)

[9] Official correspondence with Trälleborg and with the ferry boats of the Sassnitz-Trälleborg line. Public correspondence is also exchanged with the latter

Weser Lightship ..	North Sea 53° 54′ 18″ N. 7° 49′ 03″ E.	KCW	80	Government ..	300	P R[10] ..	N	0.37.5[9]	3.75[9]	[10] The station is prepared to receive calls chiefly during the first fifteen minutes of the second half of each of its hours of service
GIBRALTAR										
North Front ..	36° 09′ 00″ N. 5° 21′ 00″ W.	BWW	—	British Admiralty	2,700 spk 4,000 cw	O ..	—	—	—	
Rock (Gibraltar) ..	36° 06′ 00″ N. 5° 21′ 00″ W.	BYW	—	British Admiralty	600 spk 2,800 cw	O, P G..	N	0.60	—	
Gibraltar (Windmill Hill)	36° 07′ 00″ N. 5° 21′ 00″ W.	BYX	—	British Admiralty	—	O ..	—	—	—	
GILBERT AND ELLICE ISLANDS										[1] The station is connected with the International Telegraph System by wireless through Nauru, Woodlark Island, and Townsville Radio [2] The station also exchanges official and public correspondence with Nauru, Tulagi, and Apia [3] With the wave-length of 600 metres [4] With the wave-length of 1,800 metres [5] The station also exchanges official and public correspondence with Washington Island [6] The station also exchanges official and public correspondence with Fanning Island
Ocean Island ..	0° 32′ 00″ S. 169° 35′ 00″ E.	VQK	400[3] 600[4]	Government of Colony	600, 1,800	P G[1 2] ..	N	0.60	—	
Fanning Island ..	3° 51′ 00″ N. 159° 21′ 00″ W.	VQN	150	F. R. Pelly ..	300, 600	P R[5] ..	—	0.60	—	
Washington Island ..	4° 45′ 00″ N. 161° 10′ 00″ W.	VQO	150	F. R. Pelly ..	300, 600	P R[6] ..	—	0.60	—	
GOLD COAST										
Accra..	5° 32′ 30″ N. 0° 12′ 00″ W.	VPG	250	Government ..	300, 600	P G ..	Greenwich Time. 08.00 to 16.00 Except Sundays	0.40	—	
GREECE										
Athens	37° 58′ 19.7″ N. 23° 43′ 13.8″ E.	SXA	—	Government ..	—	O ..	—	—	—	[1] Under construction
Corfou Potamo ..	39° 37′ 00″ N. 19° 53′ 00″ E.	FGC	—	French Navy ..	—	—	—	—	—	
Preveza[1]	38° 56′ 00″ N. 20° 46′ 00″ E.	—	—	—	300, 600, 1,200, 2,400	—	—	—	—	
Salamis	Island of Salamis 37° 58′ 15″ N. 23° 32′ 00″ E.	SXL	—	Government ..	—	O ..	—	—	—	
Salonique	40° 36′ 00″ N. 22° 59′ 00″ E.	SXC	—	Government ..	—	O ..	—	—	—	
Syra	Island of Syra 37° 25′ 43″ N. 24° 56′ 33″ E.	SXS	—	Government ..	—	O ..	—	—	—	
Thassos	Island of Thassos 40° 46′ 00″ N. 24° 43′ 30″ E.	SXT	—	Government ..	—	O ..	—	—	—	

Land Stations—Continued

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
	Meridian of Greenwich.							Francs.	Francs.
GUADELOUPE									
Guadeloupe	16° 15′ 00″ N. 61° 35′ 00″ W.	FKD	—	Government ..	—	O ..	—	—	—
GUATEMALA									
Guatemala City ..	—	—	—	—	—	P ..	—	—	—
Puerto Barrios ..	—	—	—	—	—	P ..	—	—	—
HAWAIIAN ISLANDS									
Fort de Russy ..	Honolulu	WZG	300	U.S. Army ..	300, **600**, 825	P G ..	—	0.30	—
He-ia Point	Island of Oahu 21° 26′ 00″ N. 157° 48′ 20″ W.	NPM	2,000	U.S. Navy ..	—	—[1]	N	—	—
Kaunakakai	Island of Molokai 21° 05′ 21″ N. 157° 01′ 29″ W.	KHO	30	Mutual Telephone Co., Ltd.	300, 450, **600**	P R ..	0700 to 1200 1300 to 1730	—	—
Kawaihae	Island of Hawaii 20° 02′ 38″ N. 155° 50′ 05″ W.	KHN	300	Mutual Telephone Co., Ltd.	300, 575, **600**	P R ..	0700 to 1200 1300 to 1730	—	—
Koko Head NPM ..	Island of Oahu 21° 17′ 00″ N. 157° 42′ 00″ W.	NPM	—	U.S. Navy ..	—	—[2]	N	—	—
Koko Head KIE ..	Island of Oahu 21° 16′ 00″ N. 157° 42′ 30″ W.	KIE	2,200	Marconi Co. of America	6,200	—[3]	N	—	—
Lahaina	Island of Maui 20° 52′ 29″ N. 156° 40′ 50″ W.	KHL	300	Mutual Telephone Co., Ltd.	300, 575, **600**	P R ..	0700 to 1200 1300 to 1730	—	—
Lihue..	Island of Kauai 21° 57′ 58″ N. 159° 22′ 16″ W.	KHM	300	Mutual Telephone Co., Ltd.	300, 575, **600**	P R ..	0700 to 1200 1300 to 1730	—	—
Pearl Harbour ..	Island of Oahu 21° 17′ 54″ N. 157° 51′ 43″ W.	NPM	300	U.S. Navy ..	300, **600**	P G[4,6] ..	N	0.30	—
Wahiawa	Island of Oahu 21° 29′ 28″ N. 158° 02′ 37″ W.	KHK	400	Mutual Telephone Co., Ltd.	300, 550, **600**, 750	P G[5] ..	N	0.50	—

Remarks.

[1] The station communicates with South San Francisco

[2] The station communicates with Seattle NVL (United States of America)

[3] The station only communicates with Bolinas (California), Tahiti (French Oceania), and Funbashi (Japan)

[4] The station signals daily weather reports and forecasts relating to the Pacific Ocean, prepared by the United States Weather Bureau at Honolulu. The message is transmitted broadcast at 0800, 1200, 1600, and 2000 (local time)

[5] This station also exchanges public correspondence with Kawaihae, Lahaina, and Lihue (Hawaiian Islands), Tutuila, and Apia (Samoa Islands)

[6] A time signal is transmitted daily. (See International Time and Weather Signals)

HAYTI (West Indies)									
Port-au-Prince ..	—	NSC	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
HOLLAND									
Amsterdam	52° 22′ 23″ N. 4° 54′ 39″ E.	PCA	—	Government ..	—	O ..	—	—	—
Apeldoorn (Gelderland) [4]	—	—	—	—	—	—	—	—	—
De Mok	53° 01′ 00″ N. 4° 45′ 00″ E.	PCE	40	—	—	O ..	X	—	—
Doggersbank Noord Lightship	56° 00′ 00″ N. 5° 00′ 00″ E.	PCP	100	Government ..	300, **400**, 600	—[1]	X	—[2]	—
Doggersbank Zuid Lightship	54° 47′ 00″ N. 4° 08′ 30″ E.	PCR	100	Government ..	300, **400**, 600	—[1]	X	—[2]	—
Flushing	51° 29′ 00″ N. 3° 37′ 00″ E.	PCD	200	—	—	O ..	X	—	—
Haaks Lightship ..	To the West of Helder 53° 00′ 00″ N. 4° 05′ 00″ E.	PCO	80	Government ..	**400**, 600	—[1]	X	—[2]	—
Helder	52° 57′ 44″ N. 4° 46′ 38″ E.	PCB	—	Government ..	—	O ..	—	—	—
Noord-Hinder Lightship	North Sea 52° 05′ 12″ N. 2° 39′ 54″ E.	PCN	40	Government ..	400	—[1]	X	—[2]	—
Scheveningen-Port ..	North Sea Coast, near The Hague 52° 06′ 00″ N. 4° 15′ 55″ E.	PCH	—	Government ..	300, 500, **600**, 1,800	P G[3] ..	N	0.40	4.00
Terschellingerbank Lightship	53° 29′ 00″ N. 4° 02′ 00″ E.	PCM	80	Government ..	300, 400, **600**	—[1]	X	—[2]	—
HONG-KONG									
Cape D'Aguilar ..	20° 12′ 30″ N. 114° 15′ 45″ E.	VPS	350	British Admiralty	300, **600**, 1,800	P G ..	N	0.60[1]	6.00[1]
Stonecutters Island..	22° 16′ 00″ N. 114° 16′ 00″ E.	BXY	1,000	British Admiralty	600–2,000 (spark) 4,000, 4,200 (arc)	O ..	—	—	—
ICELAND									
Reykjavik Radio ..	64° 08′ 04″ N. 21° 54′ 37″ W.	TFA	400	Government ..	300, **600**, 1,800	P G ..	Greenwich Time. 0900 to 1100 1500 to 1900 2100 to 0100	0.40	4.00
Flatey á Breidafirdi	65° 22′ 30″ N. 22° 55′ 24″ W.	TFB	250	Government ..	300, **600**	P G ..	1100 to 1300 1700 to 1900 2100 to 2300	0.40	4.00

HOLLAND:

[1] The station is intended for: (a) The transmission to the Scheveningen-Port coast station of telegrams received by means of flag signals from ships passing within sight, or the retransmission by means of these signals, to such ships, of telegrams sent to it through the Scheveningen-Port coast station; (b) meteorological services

[2] Telegrams originating on or intended for ships and forwarded through Scheveningen-Port are subject to the charge for transmission over the inland telegraph lines, and a fixed charge of fr. 1.00 per telegram

[3] The station transmits daily except Sundays and holidays a meteorological telegram on the wave-length of 1,800 metres. (For particulars, see International Time and Weather Signals — Holland)

[4] Under construction

HONG-KONG:

[1] This includes the inland charge

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
INDIA										
Ajmer[1]	26° 35′ 00″ N. 74° 42′ 00″ E.	VWR	—	Indian Government	—	O ..	—	—	—	
Allahabad[1]	25° 26′ 00″ N. 81° 55′ 00″ E.	VWA	—	Indian Government	—	O ..	—	—	—	
Bombay Radio ..	18° 55′ 00″ N. 72° 54′ 00″ E.	VWB	300	Indian Government	300, **600**	P G[2,3] ..	N	0.35	—	
Calcutta Radio ..	22° 35′ 00″ N. 88° 25′ 00″ E.	VWC	300	Indian Government	300, **600**	P G[3,4] ..	N	0.35	—	
Delhi[1]	28° 44′ 00″ N. 77° 00′ 00″ E.	VWD	—	Indian Government	—	O ..	—	—	—	
Dinapur[1]	25° 36′ 00″ N. 84° 57′ 00″ E.	VWI	—	Indian Government	—	O ..			—	
Karachi Radio ..	Mouths of the Indus 24° 50′ 00″ N. 67° 00′ 00″ E.	VWK	300	Indian Government	300, **600**	P G[3,4] ..	N	0.35		
Lahore[1]	31° 40′ 00″ N. 74° 25′ 00″ E.	VWL	—	Indian Government	—	O ..	—	—	—	
Madras Radio	13° 05′ 00″ N. 80° 17′ 16″ E.	VWM	300	Indian Government	300, **600**	P G[3] ..	N	0.35	—	
Mhow[1]	22° 33′ 00″ N. 75° 45′ 00″ E.	VWH	—	Indian Government	—	O ..	—	—	—	
Nagpur[1]	21° 17′ 00″ N. 79° 15′ 00″ E.	VWN	—	Indian Government	—	O ..	—	—	—	
Peshawar[1]	34° 02′ 00″ N. 71° 40′ 00″ E.	VWP	—	Indian Government	—	O ..	—	—	—	
Quetta[1]	30° 15′ 00″ N. 67° 00′ 00″ E.	VWQ	—	Indian Government	—	O ..	—	—	—	
Sandheads	At the South of the Ganges Delta 21° 00′ 00″ N. 88° 09′ 00″ E.	VWS	200	Indian Government	300, **600**	P G[3] ..	0636 to 1836[5]	0.35	—	
Secunderabad[1] ..	17° 32′ 00″ N. 78° 33′ 00″ E.	VWX	—	Indian Government	—	O ..	—	—	—	
Shillong[1]	25° 30′ 00″ N. 91° 52′ 00″ E.	VWG	—	Indian Government	—	O ..	—	—	—	
Simla[1]	31° 06′ 00″ N. 77° 11′ 00″ E.	VWJ	—	Indian Government	—	O ..	—	—	—	

[1] Interior station

[2] During the daytime the station is largely occupied with inland communication

[3] Information regarding weather is distributed twice daily from the station at 1310 and 0110 (Indian standard time)

[4] Information regarding weather distributed twice daily at 1300 and 0100; also time signals are transmitted daily. (See International Time and Weather Signals)

[5] Time of British India 5 hours 30 min. in advance of Greenwich time

ITALIAN SOMALILAND										
Bardera	2° 21′ 10″ N. 42° 16′ 15″ E.	ISN	200	Government ..	700–750	P G ..	Sunrise to sunset	0.30[1]	—	
Brava	Bénadir 1° 06′ 25″ N. 44° 02′ 04″ E.	ISC	200	Government ..	700–750	P G ..	Sunrise to sunset	0.30[1]	—	
Bulo Burti	3° 52′ 00″ N. 45° 34′ 00″ E.	ISJ	100	Government ..	600	P G ..	Sunrise to sunset	0.30	—	
Giumbo	Bénadir 0° 14′ 51″ S. 42° 37′ 27″ E.	ISD	200	Government ..	700–750	P G ..	Sunrise to sunset	0.30[1]	—	
Iscia Baidoa.. ..	3° 07′ 10″ N. 43° 39′ 31″ E.	ISH	160	Government ..	300, 600, 800	P G ..	Sunrise to sunset	0.30[1]	—	
Itala	Bénadir 2° 45′ 27″ N. 46° 19′ 43″ E.	ISM	100	Government ..	300	P G ..	Sunrise to sunset	0.30[1]	—	
Lugh	3° 48′ 00″ N. 42° 36′ 00″ E.	ISO	100	Government ..	300	P G ..	Sunrise to sunset	0.30[1]	—	
Mahaddei Uen ..	2° 58′ 14″ N. 45° 31′ 01″ E.	ISF	160	Government ..	600	P G ..	Sunrise to sunset	0.30[1]	—	
Merka	Bénadir 1° 42′ 49″ N. 44° 46′ 22″ E.	ISB	160	Government ..	300	P G ..	Sunrise to sunset	0.30[1]	—	
Mogadiscio ISE ..	Bénadir 2° 02′ 13.5″ N. 45° 21′ 14.5″ E.	ISE	160	Government ..	300	P G ..	Sunrise to sunset	0.30[1]	—	
Mogadiscio ISG[4] ..	Bénadir 2° 02′ 13.5″ N. 45° 21′ 14.5 E.	ISG	1,600	Government ..	4,000	P G[3, 4]..	X	0.30	—	
Oddur	4° 07′ 05″ N. 43° 45′ 00″ E.	ISI	100–150	Government ..	300, 600	P G ..	0600 to 1800[2]	0.30	—	

[1] The charge applicable to the transmission of radiotelegrams between the stations of Italian Somaliland is fixed at fr. 2.52 per radiotelegram of ten words or less, with fr. 0.25[20] additional for each word over ten

[2] Italian Somaliland official time, 3 hours in advance of Greenwich time

[3] The station also transmits messages to the coast station Massaua. Charge per word: fr. 0.60 for private telegrams; fr. 0.30 for press telegrams.

[4] This station exchange public correspondence direct with the Rome (S. Paulo) station

ITALY										
Arta Radio	40° 31′ 00″ N. 19° 29′ 00″ E.	IDM	—	Government ..	—	O ..	—	—	—	
Aspio Radio.. ..	43° 31′ 40″ N. 13° 31′ 29″ E.	ICA	270	Government ..	300, 600	P G ..	N	0.30	—	
Bologna	44° 30′ 00″ N. 11° 20′ 00″ E.	IGB	—	Army	—	O ..	—	—	—	
Brindisi Radio ..	Province of Lecce 40° 38′ 43″ N. 17° 56′ 44″ E.	ICE	270	Government ..	300, 600	P G ..	N	0.30	—	
Cagliari Radio ..	Sardinia 39° 12′ 30″ N. 9° 33′ 30″ E.	ICC	270	Government ..	300, 600	P G ..	Sunrise to sunset	0.30	—	
Capo Sperone Radio	Sardinia, Island of S. Antioco 38° 57′ 59″ N. 8° 24′ 42″ E.	ICR	270	Government ..	300, 600	P G ..	N	0.30	—	
Centocelle	41° 55′ 00″ N. 12° 27′ 00″ E.	ICD	—	—	—	O ..	—	—	—	

[1] Exclusively for the service of the steam ferry boats of the Strait of Messina

[2] Radiotelegrams in plain language, Italian, French or English, concerning the movements and security of ships, and exchanged between the captains of ships and their owners or agents, are accepted

[3] This station is opened for public service direct to Italian Somaliland and Erythrea communicating with Mogadiscio ISG (Italian Somaliland) and Massaua ICX (Erythrea)

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
ITALY—*contd.*										
Centopozzi Radio ..	Puglie, Province of Foggia 41° 42′ 00″ N. 15° 36′ 45″ E.	ICM	160	Government ..	300, **600**	P G ..	Sunrise to sunset	0.30	—	
Civitavecchia Radio	42° 05′ 22″ N. 11° 47′ 33″ E.	IDL	150	—	300, **600**	P G ..	N	0.30	—	
Coltano	43° 38′ 00″ N. 10° 24′ 00″ E.	ICI	—	Government ..	**6,500**	—	—	—	—	
Cotrone Radio ..	39° 04′ 48″ N. 17° 08′ 18″ E.	IDH	50	—	300, **600**	P G ..	N	0.30	—	
Firenze	43° 40′ 36″ N. 11° 10′ 25″ E.	IGF	—	Army	—	O ..	—	—	—	
Genova Radio ..	44° 25′ 44″ N. 8° 56′ 02″ E.	ICB	160	Government ..	300, **600**	P G ..	N	0.30	—	
Livorno Radio ..	43° 33′ 00″ N. 10° 19′ 00″ E.	IDK	—	Government ..	—	—	—	—	—	
Maddalena Radio ..	Strait of Bonifacio, Maddalena Island 41° 12′ 50″ N. 9° 25′ 10″ E.	ICH	215	Government ..	300, **600**	P G ..	N	0.30	—	
Marsala Radio ..	37° 51′ 00″ N. 12° 23′ 00″ E.	IDP	—	Government ..	—	—	—	—	—	
Messina Radio ..	38° 16′ 01″ N. 15° 37′ 27″ E.	ICF	150	Government ..	300, **600**	P G ..	N	0.30	—	
Messina	38° 15′ 00″ N. 15° 37′ 27″ E.	IFM	27	Government (State Railways)	50	O[1] ..	—	—	—	
Milano	45° 20′ 40″ N. 9° 10′ 05″ E.	IGM	—	Army	—	O ..	—	—	—	
Napoli Radio ..	40 50′ 14″ N. 14° 15′ 36″ E.	ICN	270	Government ..	300, **600**	P G ..	N	0.30	—	
Otranto Radio ..	40° 09′ 00″ N. 18° 30′ 00″ E.	IDG	—	Government ..	—	—	—	—	—	
Palermo Radio ..	38° 11′ 48″ N. 13° 16′ 40″ E.	ICP	270	Government ..	300, **600**	P G ..	Sunrise to sunset	0.30	—	
Reggio Calabria ..	38° 08′ 00″ N. 15° 38′ 30″ E.	IFR	27	Government (State Railways)	50	O[1] ..	—	—	—	
Roma	—	—	—	Army	—	O ..	—	—	—	
Rome (S. Paolo)[2] ..	41° 52′ 00″ N. 12° 29′ 00″ E.	IDO	—	Navy	11,000 cw.	P G[3] ..	—	—	—	

San Cataldo Bari ..	41° 08′ 00″ N. 16° 52′ 00″ E.	ICQ	160	Government ..	600	—	0800 to 0000	—	—	
Saseno Radio ..	40° 30′ 00″ N. 19° 17′ 00″ E.	IDB	—	Government ..	—	—	—	—	—	
Spezia	41° 53′ 00″ N. 12° 22′ 00″ E.	ICS	—	Army	—	O ..	—	—	—	
Stromboli Radio ..	15° 48′ 00″ N. 15° 07′ 00″ E.	IDE	—	Government ..	—	—	—	—	—	
Taranto	40° 28′ 05″ N. 17° 15′ 05″ E.	ICT	—	Army	—	O ..	—	—	—	
Torino	45° 00′ 20″ N. 7° 40′ 10″ E.	IGT	—	Army	—	O ..	—	—	—	
Treviso	45° 30′ 53″ N. 12° 10′ 26″ E.	IGV	—	Army	—	O ..	—	—	—	
Venezia Radio ..	43° 23′ 00″ N. 12° 21′ 00″ E.	ICZ	160	Army	300, **600**	O [1] ..	N	—	—	
Villa San Giovanni ..	Calabria, Strait of Messina 38° 10′ 00″ N. 15° 38′ 00″ E.	IFV	27	Government (State Railways)	50	O[1] ..	—	—	—	
Vittoria Radio ..	Sicily, Province of Syracuse 36° 56′ 50″ N. 14° 31′ 50″ E.	ICV	270	Government ..	300, **600**	P G ...	N	0.30	—	
JAMAICA										
Christiana, Jamaica	—	BZQ	500	British Admiralty	600[1]	O, P G .	N	0.60	6.00	[1] Other wave-lengths are used for official correspondence
Kingston, Jamaica ..	17° 57′ 00″ N. 76° 47′ 00″ W.	VQI	100	Direct West India Cable Co.	600	P G ..	—	0.60	—	
JAPAN										
Chosi Radio ..	Hondo, Inuboye Point 35° 44′ 08″ N. 140° 51′ 12″ E.	JCS	450	Ministry of Communications	300, **600**, 1,800	P G[1 2] ..	N	0.60[3]	—	[1] The station transmits each night (except Sundays) time signals on a wave-length of 600 metres. (See International Time and Weather Signals)
Dairenwan	Peninsula of Kwan-tung 38° 57′ 50″ N. 121° 53′ 15″ E.	JDA	350	—	300, **600**	P G[2 4] ..	N[4]	0.60[3]	—	[2] The stations Chosi Radio, Fukkikaku and Dairenwan transmit warnings of typhoons. No charge is made for these messages except when a message is made by the special request of the ship. (See International Time and Weather Signals)
Fukkikaku	Island of Formosa, Formosa Strait 25° 18′ 00″ N. 121° 32′ 00″ E.	JFK	400	Ministry of Communications	300, **600**	P G[2] ..	N	0.60[3]	—	
Funabashi Radio ..	Yedo Bay, near Funabashi	JJC	—	Ministry of Marine and Ministry of Communications	4,000–7,000	P G[5] O[6]	—	—	—	[3] This charge includes the charge applicable to the transmission over the lines of the Japanese telegraph service of radiotelegrams originating in or intended for the empire of
Horomushiro Radio	Paramushir Island 50° 29′ 20″ N. 156° 07′ 30″ E.	JHJ	450	Ministry of Communications	300, **600**	P G[12]	N[13]	0.60[3 14]	—	
Komonto[7]	Chosen, Island Komonto 34° 05′ 55″ N. 126° 36′ 12″ E.	JKM	200	—	—	—[8]	N	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
JAPAN—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Maizuru Radio ..	Wakasa Bay, near Maizuru	JMZ	—	Ministry of Communications	300, **600**, 900–3,500 [6]	P G ..	N	0.60 [3]	—
Minamioagarijima ..	Borodino Islands 25° 51′ 00″ N. 131° 15′ 00″ E.	JYU	200	Toyo Seito Kaisha	300, **600**	— [10]	Mean time of the meridian 135° E. of Greenwich, 1900 to 0000	—	—
Mokpo [7]	Chosen, port of Mokpo 34° 47′ 03″ N. 126° 23′ 05″ E.	JMP	200	—	—	— [8]	N	—	—
Osezaki Radio ..	Kyushyu, Goto Islands 32° 37′ 20″ N. 128° 37′ 08″ E.	JOS	450	Ministry of Communications	300, **600**, 1,800	P G ..	N	0.60 [3]	—
Otchishi Radio ..	Hokkaido, Pacific coast 43° 10′ 17″ N. 145° 30′ 20″ E.	JOC	450	Ministry of Communications	300, **600**	P G ..	N	0.60 [3]	—
Rasajima	Rasa Island 24° 29′ 30″ N. 131° 13′ 00″ E.	JSA	450	Ministry of Communications	300, **600**, 1,800	P R [11] ..	—	—	—
Shimotsui Radio ..	Inland Sea 34° 26′ 30″ N. 133° 48′ 05″ E.	JSX	300	Ministry of Communications	300, **600**, 1,800	P G ..	N	0.60 [3]	—
Shiomisaki Radio ..	Hondo, Kii Channel 33° 25′ 32″ N. 135° 46′ 08″ E.	JSM	250	Ministry of Communications	300, **600**	P G ...	N	0.60 [3]	—
Shogetsubito [7] ..	Chosen, port of Chemulpo 37° 28′ 19″ N. 126° 36′ 20″ E.	JSB	200	—	—	— [9]	N	—	—
Shoseito [7]	Chosen, Island of Shoseito 37° 45′ 36″ N. 124° 43′ 45″ E.	JSS	300	—	—	— [9]	N	—	—

Remarks.

Japan or Southern Manchuria; but for urgent radiotelegrams there is an additional charge of fr.0.25 per word

[4] The greater part of the day that is during the hours mentioned below, and certain hours during the night are principally occupied with official correspondence: 0800–0900, 0930–1100, 1130–1300, 1330–1500, 1530–1700, 1730–1800

[5] The station also exchanges public correspondence with Koko Head NPM (Hawaiian Islands)

[6] The station transmits each day time signals on a wave-length of 4,000 metres except Sundays. (See International Time and Weather Signals)

[7] Lighthouse

[8] Correspondence limited to the other lighthouses in Chosen, with the ship Kosai Maru belonging to the Chosen Government and Japanese warships

[9] For official correspondence.

[10] The station only corresponds with other fixed stations

[11] Public correspondence with the Japanese ship stations. The station also communicates with

Tsunoshima Radio..	Hondo, near Shimonoseki 34° 21′ 00″ N. 130° 50′ 00″ E.	JTS	200	Ministry of Communications	300, **600**	P G ..	N	0.60[14]	—	the other coast stations in Japan [12] This station connects with the International Telegraph System through the medium of Otchishi Radio [13] The station is open approximately from May 1st to September 30th [14] This charge includes the charge for transmission between Horomushiro Radio and Otchishi Radio
LABRADOR										
American Tickle	55° 41′ 00″ N. 53° 28′ 00″ W.	VOC	100	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	[1] The station is open for public correspondence in the inland service [2] Atlantic standard time, four hours later than Greenwich time [3] The station is only open during the season of navigation approximately July to October [4] The station transmits weather forecasts free of charge on request by ship stations
Battle Harbour ..	52° 17′ 00″ N. 55° 36′ 00″ W.	VOA	150	Marconi Co. of Canada	**300**, 600	—[1]	0800 to 2000[13]	0.60	—	
Cape Harrison ..	54° 52′ 00″ N. 58° 03′ 00″ W.	VOH	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Domino	52° 28′ 00″ N. 55° 44′ 00″ W.	VOD	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Grady, Labrador ..	53° 48′ 00″ N. 56° 23′ 00″ W.	VOE	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Holton, Labrador ..	54° 35′ 00″ N. 57° 15′ 00″ W.	VOG	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Mokkovik	55° 13′ 00″ N. 59° 08′ 00″ W.	VOI	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Point Armour ..	Strait of Belle Isle 51° 27′ 26″ N. 56° 50′ 28″ W.	VCL	150	Marconi Co. of Canada	**300**, 600	P G[4] ..	N	0.30	—	
Smokey Tickle ..	54° 26′ 00″ N. 57° 11′ 00″ W.	VOF	150	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
Venison Island ..	55° 46′ 00″ N. 53° 14′ 00″ W.	VOB	100	Marconi Co. of Canada	600	—[1]	0800 to 2000[13]	0.60	—	
LIBERIA										
Monrovia	6° 16′ 40″ N. 10° 49′ 36″ W.	FMA	400	French Government	600	P G ..	Sunrise to sunset	0.30	—	
MADAGASCAR										
Ambohibe[4]	—	—	—	—	—	—	—	—	—	[1] The station also communicates by radiotelegraphy with Dzaoudzi. In case of interruption of the inland telegraph lines, the Diégo-Suarez and Majunga stations exchange by radiotelegraphy the inland and international correspondence
Diégo-Suarez ..	North of Madagascar 12° 15′ 04″ S. 49° 22′ 45″ E.	FDG	325	French Government	300, **600**	P G[12] O	0700 to 1100[2] 1330 to 1700 1900 to 2100	0.50	—	
Maintirano[4] ..	18° 11′ 00″ S. 44° 00′ 00″ E.	—	—	—	—	—	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
	Meridian of Greenwich.							Francs.	Francs.	
MADAGASCAR—*contd.*										
Majunga	Mozambique Channel 15° 43′ 00″ S. 46° 20′ 14″ E.	FJA	450	French Government	300, **600**	P G [2] [3]	0700 to 1100 [3] 1330 to 1700 1900 to 2000	0.50	—	[2] A service giving warning of the passage of cyclones has been organised as an experiment, on the east, north-west, and west coasts of Madagascar [3] Third time belt east of the Greenwich belt [4] Under construction
Tananrive [4]	18° 55′ 00″ S. 47° 30′ 00″ E.	—	—	—	—	—	—	—	—	
Tullear [4]	23° 20′ 00″ S. 43° 45′ 00″ E.	—	—	—	—	—	—	—	—	
MALAY PENINSULA										
Penang Radio ..	5° 31′ 00″ N. 100° 23′ 00″ E.	VPX	—	Straits Settlements Government	600	P G ..	—	0.40	—	
Singapore (Seletar)	1° 24′ 00″ N. 103° 51′ 00″ E.	BXW	1,000	British Admiralty	600–2,000 (spark) 4,000 (arc)	O ..	—	—	—	
Singapore Radio ..	1° 22′ 00″ N. 103° 51′ 00″ E.	VPW	350	Straits Settlements Government	**600**, 1,800	P G ..	Weekdays: 0600 to 1200 1800 to 0000 Sundays: 0800 to 1000 1430 to 1630 2000 to 2200	0.40	—	
MALTA										
Malta Island	35° 55′ 17″ N. 14° 29′ 24″ E.	VPT	200	Eastern Telegraph Co.	**300**, 600	P G [1] ..	N	0.30	—	[1] The handling of public correspondence has been suspended
Malta, Rinella Bay ..	35° 53′ 00″ N. 14° 32′ 00″ E.	BYZ	—	British Admiralty	—	O ..	—	—	—	
Malta, S. Angelo ..	35° 53′ 00″ N. 14° 31′ 00″ E.	BYY	—	British Admiralty	—	P G, O ..	—	0.60	—	
MARIANNE ISLANDS										
Guam [1]	13° 27′ 12″ N. 144° 44′ 08″ E.	NPN	100	U.S. Navy ..	300, **600**	P G ..	N	0.30 [2]	—	[1] Operated by the United States Naval Communication Service, Radio, Virginia [2] No charge is made for relaying messages

MARSHALL ISLANDS										
Nauru	0° 25′ 43″ S. 166° 56′ 23″ E.	VKT	—	—	—	P G[1] ..	—	0.60	—	[1] This station is connected with the International Telegraph System by wireless through Woodlark Island and Townville Radio
MARTINIQUE										
Fort de France ..	14° 35′ 50″ N. 61° 04′ 00″ W.	FKQ	300	French Navy ..	**600**, 800[1], 1,000[1]	P G[2] ..	N	0.30	—	[1] For official correspondence. [2] General public correspondence may be admitted if the station is not engaged with official correspondence
MAURITIUS										
Mauritius	20° 08′ 00″ S. 57° 20′ 00″ E.	BZG	1,000	British Admiralty	600–2,000 (spk) 4,000 (arc)	P G ..	—	0.60	—	
MEXICO							Mean time of the meridian of Tacubaya.[1]			
Acapulco de Guerrero	16° 50′ 41″ N. 99° 54′ 26″ W.	XAK	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	[1] Mean time of the meridian of Tacubaya: six hours 36 minutes 46·67 seconds later than Greenwich time. [2] The station also exchanges ordinary telegrams originating in or intended for the peninsula of Yucatan. [3] The station transmits daily at noon, time signals and a weather report. (See International Time and Weather Signals.) [4] The station also exchanges ordinary telegrams originating in or intended for Lower California. [5] For correspondence with fixed stations
Alamos de Sonora ..	27° 01′ 19″ N. 108° 55′ 59″ W.	XAD	500	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	
Campeche	19° 50′ 47″ N. 90° 32′ 14″ W.	XAB	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G[2 3] ..	0800 to 2200	0.45	4.50	
Chapultepec (Mexico City)	19° 30′ 00″ N. 98° 30′ 00″ W.	XDA	—	Government ..	—	—	—	—	—	
Guaymas	Sonora 27° 55′ 30″ N. 110° 53′ 34″ W.	XAH	200	Government ..	300, **600**, 900,[5] 1,200[5]	P G[3] ..	0800 to 2200	0.45	4.50	
La Paz de la Baja, California	Gulf of California 24° 10′ 12″ N. 110° 21′ 05″ W.	XAF	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	
Mazatlán de Sinaloa	Sinaloa 23° 11′ 55″ N. 106° 25′ 20″ W.	XAE	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G[3 4] ..	0800 to 2200	0.45	4.50	
Merida de Yucatan	20° 58′ 05″ N. 89° 37′ 21″ W.	XAM	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	
Payo Obispo	Quintana Roo 18° 29′ 39″ N. 88° 21′ 30″ W.	XAC	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G[3] ..	0800 to 2200	0.45	4.50	
Puerto Lobos ..	Vera Cruz 21° 28′ 00″ N. 97° 13′ 03″ W.	XAL	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	
Salina Cruz	Oaxaca 16° 09′ 37″ N. 95° 12′ 11″ W.	XAN	300	Government ..	300, **600**	P G ..	0800 to 2200	0.45	4.50	
S. Rosalia de la Baja, California	Lower California 27° 24′ 00″ N. 112° 20′ 00″ W.	XAG	100	Government ..	300, **600**	P G[4] ..	0800 to 2200	0.45	4.50	
Tampico de Tamaulipas	22° 13′ 00″ N. 97° 51′ 19″ W.	XAJ	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
MEXICO—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Túxpan de Veracruz	20° 57′ 18″ N. 97° 23′ 59″ W.	XAI	300	Government ..	300, **600**, 900,[5] 1,200[5]	P G ..	0800 to 2200	0.45	4.50	
Veracruz de Veracruz	19° 12′ 02″ N. 96° 08′ 16″ W.	XAA	500	Government ..	300, **600**, 900,[5] 1,200[5]	P G[33] ..	0800 to 2200	0.45	4.50	
MOROCCO							Greenwich Time.			
Agadir	—	—	—	Army (French) ..	—	O ..	—	—	—	
Alhucemas	—	EGO	—	Army (Spanish) ..	—	O ..	—	—	—	
Casablanca, Maroc	33° 36′ 30″ N. 7° 37′ 00″ W.	CNP	430	French Government	300, **600**	P G ..	0600 to 0000	0.25[1] (a)	—	
Casablanca-Chetaba[2]	33° 35′ 21″ N. 7° 34′ 10″ W.	FCH	—	Navy (French) ..	—	D F[2] ..	—	—	—	
Casablanca Médiouna[3]	—	HWM	—	—	—	—	—	—	—	
Ceuta..	35° 48′ 40″ N. 5° 16′ 24″ W.	EGD	320	Army (Spanish)..	600, 1,200, 1,500	O ..	N	—	—	
Fez..	—	—	—	French Government	—	O ..	—	—	—	
Larache	35° 12′ 00″ N. 6° 12′ 00″ W.	EGF	220	Army (Spanish)..	600, 900, 1,200	O ..	N	—	—	
Melilla	35° 18′ 15″ N. 2° 56′ 25″ W.	EGB	320	Army (Spanish) ..	600, 1,200, 1,600	O ..	N	—	—	
Mogador	31° 31′ 00″ N. 9° 46′ 00″ W.	CNY	430	French Government	300, **600**	P G ..	0600 to 0000	0.25[1] (b)	—	
Rabat	34° 02′ 15″ N. 6° 50′ 30″ W.	CNF	110	French Government	450	O ..	0600 to 0700 1800 to 1900	—	—	
Tanger	35° 47′ 15″ N. 5° 49′ 00″ W.	CNW	430	French Government	300, **600**	P G ..	0600 to 0000	0.25[1] (c)	—	
Tetuan	—	EGK	—	Army (Spanish) ..	—	O ..	—	—	—	
NAVASSA ISLAND										
Navassa Island ..	Windward Passage 18° 30′ 00″ N. 74° 52′ 00 W.	NKC	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	

[1] In the case of radiotelegrams originating at or intended for the place named against the letter in the reference the charge for transmission between such place and the coast station concerned is included in the coast tax: a. Casablanca, Maroc.; b. Mogador; c. Tanger

[2] Direction finding station; transmission done by Casablanca, Maroc, CNP

[3] Under construction

NEW BRITAIN										
Rabaul	4° 24′ 00″ S. 152° 18′ 00″ E.	VJZ	—	Australian Government	—	P G[1] ..	—	0.60	—	[1] The station is connected with the International Telegraph System by wireless through Woodlark Island and Townsville Radio
NEW CALEDONIA										
Nouméa-Sémaphore	22° 16′ 12″ S. 166° 27′ 32″ E.	FQN	400	Government ..	300, **600**	P G ..	Local Time. 1000 to 1100 1400 to 1500 1700 to 1800 2000 to 0000	0.40[1]	—	[1] The charge is reduced to 20 centimes for correspondence with ships engaged on a regular service on the coast of New Caledonia and Dependencies
NEWFOUNDLAND										
Belle Isle	To the North of Newfoundland 51° 52′ 53″ N. 55° 21′ 49″ W.	VCM	250	Marconi Co. of Canada	300, **600**	P G[1] ..	N	0.30	—	[1] The station transmits weather forecasts. (See International Time and Weather Signals)
Cape Race ..	46° 39′ 24″ N. 53° 04′ 17″ W.	VCE	500	Marconi Co. of Canada	300, **600**, 1,600	P G[1] ..	N	0.85	—	[2] Independent direction finding station
Cape Race[2] ..	46° 39′ 10″ N. 53° 05′ 05″ W.	VAZ	250	—	600	D F[2] ..	—	—	—	[3] The station is open for public correspondence in the inland service
Cape Ray	47° 37′ 00″ N. 59° 18′ 00″ W.	VCR	350	Marconi Co. of Canada	300, **600**, 1,600	P G[1] ..	N	0.30	—	[4] Atlantic standard time, 4 hours later than Greenwich time
Fogo	Fogo Island 49° 40′ 00″ N. 53° 57′ 00″ W.	VOJ	250	Marconi Co. of Canada	**300**, 600	—[3]	0800 to 2000[4]	0.85	—	[5] The station is only open during the season of navigation, approximately April to December
Point Riche	Strait of Belle Isle 50° 42′ 00″ N. 57° 24′ 30″ W.	VCH	250	Marconi Co. of Canada	300, **600**	P G[1] ..	N[5]	0.30	—	
St. Johns	47° 34′ 00″ N. 52° 40′ 00″ W.	BZM	1,000	British Admiralty	600-2,000 (spk) 4,000, 4,200, 5,000 (arc)	O ..	—		—	
NEW GUINEA										[1] The station is connected to the International Telegraph System through Port Moresby and Thursday Island Radio by wireless
Eitape	3° 10′ 00″ S. 142° 30′ 00″ E.	VZX		Australian Government	—	P G ..	—	0.60	—	[2] When necessary, or when requested by vessels, the station transmits weather forecasts
Madang	5° 13′ 00″ S. 145° 49′ 00″ E.	VIV		Australian Government	—	P G[1] ..	—	0.60	—	[3] The station is connected to the International Telegraph System by wireless through Thursday Island Radio
Morobe	—	VZK	—	Australian Government	—	P G ..	—	0.60	—	[4] In the case of radiotelegrams originating at or intended for Port
Port Moresby Radio	9° 28′ 30″ S 147° 09′ 30″ E.	VIG	500	Australian Government	300, 450, **600**	P G[2 3]	N	0.30[4 5] 0.60[4 6]	— —	
Samarai	10° 42′ 00″ S. 150° 50′ 00″ E.	VIJ	—	Australian Government	—	P G ..	—	0.60	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
NEW HEBRIDES										
Port Vila	17° 44′ 00″ S. 168 19′ 00″ E.	HNV	—	Government ..	—	P G ..	—	—	—	Moresby the local land charge is included in the coast tax [3] For radiotelegrams exchanged with ships subject to the administration of Australia or of New Zealand [4] For radiotelegrams exchanged with ships other than those subject to the administration of Australia or of New Zealand
NEW IRELAND										
Kawieng	2° 45′ 00″ S. 151° 02′ 00″ E.	VZR	—	Australian Government	—	P G ..	—	0.60	—	
NEW ZEALAND							Mean time of New Zealand.[1]			
Auckland	36° 51′ 00″ S. 174° 46′ 00″ E.	VLD	—	Government ..	—	O, P G..	1900 to 0600	0.57.8[3] 0.26.3[4]	—	[1] Mean time of New Zealand, 11 hours 30 minutes in advance of Greenwich time [2] In addition a continuous listening service for distress signals will be maintained [3] Rate applicable to messages to or from vessels trading to ports outside Australasia [4] Rate applicable to messages to or from vessels trading exclusively between (a) New Zealand and Australia, and (b) on the New Zealand coast [5] Radiotelegrams can be sent from ships to Chatham Islands to be relayed by that station to a coast station situated in New Zealand. A relaying
Awanui Radio ..	Auckland, Mongonui 34° 54′ 00″ S. 173° 18′ 00″ E.	VLA	300	Government ..	300, **600**, 1,800, 2,500, 3,500	P G[4] ..	1830 to 0000[2]	0.57.8[3] 0.26.3[4]	—	
Awarua Radio ..	Otago, near Bluff Harbour 46° 30′ 00″ S. 168° 23′ 00″ E.	VLB	300	Government ..	300, **600**, 2,000, 2,500, 3,500	P G ..	1800 to 0000[2]	0.57.8[3] 0.26.3[4]	— —	
Chatham Islands ..	43° 57′ 00″ S. 176° 57′ 00″ W.	VLC	300	Government ..	300, **600**	P G ..	0900 to 1300 1500 to 1700 1900 to 0000	0.57.8[3,5] 0.26.3[4,5]	— —	
Wellington Radio ..	41° 17′ 05″ S. 174° 46′ 39″ E.	VLW	325	Government ..	300, **600**	P G ..	N	0.57.8[3] 0.26.3[4]	— —	
NICARAGUA										
Managua	12° 15′ 00″ N. 86° 01′ 00″ W.	NAZ	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	

NIGERIA										
Lagos..	6° 26′ 35″ N. 3° 23′ 55″ E.	VPY	250	African Direct Cable Co. ..	300, 600	P G ..	Greenwich Time. 0700 to 2100 Sundays: 0800 to 1000 1600 to 1800	0.60	—	rate of fcs. 0.42 per word s charged in addition to the New Zealand coast station tax [4] A time signal is sent upon application. (See International Time and Weather Signals)
NORWAY							Central European Time.			
Bergen Radio ..	North Sea Coast 60° 24′ 30″ N. 5° 22′ 00″ E.	LGN	270	Government ..	300, 600	P G ..	N	0.28	2.80	
Björnöen Radio ..	Arctic Ocean 74° 27′ 45″ N. 19° 17′ 15″ E.	LWP	225	Björnöen A/S Stavanger	1,600, 600	P R [7] ..	—	—	—	
Fauske [8]	67° 18′ 00″ N. 15° 40′ 00″ E.	—	—	—	600, 2,000	—	—	—	—	
Flekkeröy Radio ..	Skager Rak 58° 04′ 05″ N. 7° 59′ 00″ E.	LDF	160	Government ..	300, 600	P G ..	N [1]	0.28	2.80	
Ingöy Radio.. ..	To the West of North Cape 71° 04′ 25″ N. 24° 09′ 20″ E.	LEI	480	Government ..	300, 600	P G ..	N [2] 0800 to 2100 [3]	0.40	4.00	
Karljohansvern Radio	Kristiania Fjord 59° 24′ 30″ N. 10° 29′ 30″ E.	LBZ	—	Government ..	—	O ..	—	—	—	
Kings Bay [5]	79° 01′ 00″ N. 12° 20′ 00″ E.	—	—	—	300, 600, 1,800	—	—	—	—	
Kristiania Radio ..	Near Kristiania 59° 59′ 20″ N. 10° 41′ 20″ E.	LCH	—	Government ..	—	O ..	—	—	—	
Röst Radio	Lofoten Islands 67° 30′ 24″ N. 12° 04′ 45″ E.	LFR	—	Government ..	300, 600	P G [4] ..	0900 to 1300 1600 to 1930 Holidays: 0800 to 1000	0.28	2.80	
Sörvaagen Radio ..	Lofoten Islands 67° 53′ 30″ N. 13° 02′ 00″ E.	LEN	—	Government ..	300, 600	P G [4] ..	0900 to 1300 1600 to 1930 Holidays: 0800 to 1000	0.28	2.80	
Stavanger Radio ..	58° 58′ 00″ N. 5° 45′ 00″ E.	LCM	—	Government ..	—	— [3]	—	—	—	
Tjömey Radio ..	Kristiania Fjord 59° 03′ 05″ N. 10° 24′ 05″ E.	LET	160	Government ..	600	P G ..	N [1]	0.28	2.80	
Trondhjem [8].. ..	63° 25′ 00″ N. 10° 25′ 00″ E.	—	—	—	—	—	—	—	—	
Utsire Radio ..	North Sea Coast 59° 18′ 10″ N. 4° 55′ 08″ E.	LGK	230	Government ..	300, 600	P G ..	N	0.28	2.80	
Væröy Radio ..	67° 40′ 20″ N. 12° 41′ 30″ E.	—	—	Government ..	—	P R [6] ..	—	—	—	

[1] The night service is performed alternately by the Flekkeröy Radio and Tjömey stations. Flekkeröy Radio is open during the nights of Tuesday, Thursday and Saturday. Tjömey is open during the nights of Monday, Wednesday, and Friday. The service between 0800 Sunday and 0800 Monday is performed alternately by the two stations

[2] During the months from May to September

[3] During the months from October to April

[4] Röst and Sörvaagen intercommunicate by wireless

[5] Trans-Atlantic public service to U.S.A.

[6] For communication with Sörvaagen and Röst Radio

[7] For communication with Ingöy Radio

[8] Under construction

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
PANAMA										[1] Operated by the United States Naval Communication Service, Radio, Virginia. [2] The station transmits time signals. (See International Time and Weather Signals—United States of America, Panamal Canal Zone.) [3] No charge is made for relaying messages. [4] Air station, also open to public correspondence. [5] Operated by distant control from Balboa. [6] La Palma station connects with the International Telegraph System through Balboa. Transmission between the two stations is carried out during the following hours: 0500 to 1000; 1200 to 1500; 1700 to 2000. Messages received at any time outside of one of these periods cannot be transmitted until the following period
Balboa[1]	Pacific entrance of the Panama Canal 8° 57′ 00″ N. 79° 33′ 30″ W.	NBA	200	U.S. Navy ..	300, **600**	P G[2] ..	N	0.30[3]	—	
Cape Mala[1]	7° 30′ 00″ N. 80° 00′ 00″ W.	NNT	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Coco Solo[4]	—	NNL	—	U.S. Navy ..	300, **600**	P G ..	N	—	—	
Colon[1]	Atlantic entrance of the Panama Canal 9° 22′ 08″ N. 79° 54′ 07″ W.	NAX	400	U.S. Navy ..	300, **600**	P G[2] ..	N	0.30[3]	—	
Darien Panama[1 5] ..	9° 07′ 20″ N. 79° 46′ 40″ W.	NBA	1,000	U.S. Navy ..	300, **600**	P G[2] ..	N	0.30	—	
La Palma[1 6] ..	8° 26′ 00″ N. 78° 08′ 30″ W.	NNW	—	U.S. Navy ..	300, **600**	P G[6] ..	N	0.30	—	
Puerto Obaldia[1] ..	9° 33′ 00″ N. 79° 13′ 00″ W.	NRK	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
PARAGUAY										[1] The station is open for public correspondence in the inland service
Asuncion	—	—	—	Government ..	—	P G[1] ..	—	—	—	
Concepcion	—	—	—	Government ..	—	P G[1] ..	—	—	—	
Encarnacion.. ..	—	—	—	Government ..	—	P G[1] ..	—	—	—	
PERIM										
Perim	Straits of Babel Mandeb	BVQ	—	British Admiralty	—	O ..	—	—	—	

PERSIAN GULF										
Bahrein	26° 14′ 00″ N. 50° 35′ 00″ E.	VTE	—	Indo-European Telegraph Dept.	600	P G[1] ..	—	0.40	—	[1] Communicates also with Bushire and Maidani-Naphtun.
Basrah	Shat el Arab 30° 31′ 00″ N. 47° 52′ 00″ E.	VTC	—	Indo-European Telegraph Dept.	—	P G[1] ..	—	0.35	—	[2] Communicates also with Basrah and Bahrein
Bushire	28° 55′ 00″ N. 50° 50′ 00″ E.	VTB	—	Indo-European Telegraph Dept.	—	P G[2] ..	—	0.35	—	[3] Communicates also with Henjam
Henjam	26° 41′ 00″ N. 55° 53′ 00″ E.	VTH	—	Indo-European Telegraph Dept.	—	P G ..	—	0.40	—	[4] Communicates with Basrah
Lingah	26° 34′ 00″ N. 54° 53′ 00″ E.	VTL	—	Indo-European Telegraph Dept.	—	P G[3] ..	—	0.40	—	
Maidani-Naphtun ..	Arabistan 31° 59′ 00″ N. 49° 19′ 00″ E.	VTN	—	Indo-European Telegraph Dept.	—	—[4]	—	—	—	
PERU	Meridian of Paris.							Sols. Peruvian.	Sols. Peruvian.	
Cachendo	16° 58′ 00″ S. 72° 03′ 00″ W.	OAB	650	Government ..	600, 3,500	P G ..	—[1]	0.12[2]	—	[1] The station is prepared to receive calls chiefly during the first 15 minutes of each of its hours of service
Callao	12° 03′ 53″ S. 79° 28′ 34″ W.	OAA	180	Government ..	600	P G ..	0800 to 1200 1400 to 1700 1900 to 2200	0.12[2]	—	[2] The coast charge given is applicable to radiotelegrams worded in plain Spanish language; for radiotelegrams in code or worded in language other than Spanish the coast charge is doubled
Chala..	15° 49′ 20″ S. 76° 38′ 49″ W.	OAC	240	Government ..	600, 760	P G ..	0800 to 1200 1400 to 1700 1900 to 2200	0.12[2]	—	[3] Interior station
Eten	—	OAG	—	Government ..	600, 1,500	P G ..	—	0.12[2]	—	
Ilo	17° 36′ 50″ S. 73° 40′ 44″ W.	OAL	240	Government ..	600, 730	P G ..	0800 to 1200 1400 to 1700 1900 to 2200	0.12[2]	—	
Iquitos[3]	3° 45′ 57″ S. 75° 36′ 56″ W.	OAY	900	Government ..	600, 1,500, 2,000, 2,500, 3,000, 3,500	P G ..	0800 to 0000	0.24[2]	—	
Masisea[3]	8° 35′ 48″ S. 76° 40′ 50″ W.	OAM	240	Government ..	2,000	P G ..	0600 to 1700	0.24[2]	—	
Orellana[3]	6° 54′ 55″ S. 77° 31′ 15″ W.	OAO	240	Government ..	2,000	P G ..	0600 to 1700	0.24[2]	—	
Pisco	13° 42′ 40″ S. 78° 32′ 38″ W.	OAP	180	Government ..	600	P G ..	0800 to 1200 1400 to 1700 1900 to 2200	0.12[2]	—	
Puerto Bermudez[3]	10° 18′ 00″ S. 77° 17′ 45″ W.	OAE	240	Government ..	2,000	P G ..	0600 to 1700	0.24[2]	—	
Putumayo[3]	2° 05′ 00″ S. 72° 40′ 00″ W.	OAU	600	Government ..	2,000	P G ..	1900 to 0000	0.24[2]	—	
Requenna[3]	8° 28′ 00″ S. 76° 13′ 00″ W.	OAQ	240	Government ..	2,000	P G ..	0600 to 1700	0.24[2]	—	
San Cristobal (Lima)	12° 03′ 06″ S. 79° 22′ 54″ W.	OAZ	900	Government ..	600, 1,500, 2,000, 3,000, 3,500, 4,000	P G ..	0800 to 0000	0.12[2]	—	
Trujille	—	OAT	—	Government ..	600, 1,500	P G ..	—	0.12[2]	—	
PHILIPPINE ISLANDS	Meridian of Greenwich.						Mean time of the Islands.[1]	Francs.	Francs.	[1] Mean time of the meridian 120° East of Greenwich
Cavite[2]	14° 28′ 55″ N. 120° 55′ 00″ E.	NPO	150	U.S. Navy ..	—	P G[4] ..	N	0.30[3]	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
PHILIPPINE ISLANDS—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Cuabo	6° 51′ 00″ N. 126° 04′ 00″ E.	CB	50	Government ..	600	P G ..	0800 to 1730	0.30	—	[2] Operated by the United States Naval Communication Service, Radio, Virginia [3] No charge is made for relaying messages [4] Operated by the Philippine Insular Government [5] Operated by the United States War Department, Washington, D.C. [6] A time signal is transmitted daily. (See International Time and Weather Signals.)
Cuyo [4]	10° 51′ 25″ N. 121° 00′ 20″ E.	WVX	150	Government ..	**600**, 1,200	P G ..	0700 to 1815	0.30	—	
Davao [5]	Mindanao 7° 04′ 00″ N. 125° 36′ 20″ E.	WVO	200	U.S. Army ..	**600**, 1200	P G ..	N	0.30	—	
Fort Drum [5]	Manila Bay, El Fraile Island 14° 18′ 23″ N. 120° 37′ 43″ E.	WVP	50	U.S. Army ..	825	O ..	—	—	—	
Fort Frank [5]	Manila Bay, Carabao Island 14° 16′ 20″ N. 120° 36′ 45″ E.	WVL	50	U.S. Army ..	300, **600**, 825	P G ..	—	0.30	—	
Fort Hughes [5] ..	Manila Bay, Caballo Island	WVM	50	U.S. Army ..	300, **600**, 825	P G ..	—	0.30	—	
Fort Mills WVN [5] ..	Manila Bay, 14° 22′ 52″ N. 120° 34′ 40″ E.	WVN	1,000	U.S. Army ..	300, **600**, 825, 1,200	P G ..	0600 to 2200	0.30	—	
Fort Mills WVZ [5] ..	Manila Bay, Corregidor Island 14° 22′ 52″ N. 120° 34′ 40″ E.	WVZ	35	U.S. Army ..	600, **825**	O ..	0600 to 2200	—	—	
Fort Wint [5]	Manila Bay, Grande Island 14° 46′ 15″ N. 120° 13′ 25″ E.	WVR	50	U.S. Army ..	1,100	O ..	—	—	—	
Fort Wm. McKinley [5]	Luzon 14° 33′ 40″ N. 121° 03′ 00″ E.	WVQ	50	U.S. Army ..	1,100	O ..	—	—	—	
Isabel de Basilan [4] ..	6° 40′ 00″ N. 121° 50′ 50″ E.	KHI	30	Government ..	200	P G ..	0820 to 1600	0.30	—	
Jolo [4]	Jolo Island 6° 02′ 40″ N. 121° 00′ 00″ E.	WVS	200	Government ..	600	P G ..	0700 to 1715	0.30	—	
Malabang [4]	Mindanao 7° 35′ 20″ N. 124° 04′ 10″ E.	WVT	200	Government ..	**600**, 1,200	P G ..	0700 to 1930	0.30	—	
Manila [6]	Luzon 14° 35′ 48″ N. 120° 58′ 47″ E.	WVU	200	U.S. Army ..	600	O ..	—	—	—	

Margosatubig ..	7° 34′ 15″ N. 123° 11′ 50″ E.	MG	150	Government ..	**600**, 900	P G ..	0715 to 1730	0.30	—	
Olongapo [2]	14° 49′ 26″ N. 120° 16′ 57″ E.	NPT	200	U.S. Navy ..	300, **600**	P G [4] ..	N	0.30 [3]	—	
Puerto Princesa [4] ..	Paragua 9° 44′ 00″ N. 118° 42′ 40″ E.	WVV	150	Government ..	**600**, 1,200	P G ..	0700 to 1800	0.30	—	
San José, Mindoro [4]	12° 27′ 30″ N. 121° 03′ 00″ E.	WVY	200	Government ..	600	P G ..	0700 to 1815	0.30	—	
Zamboanga [4] ..	Mindanao 6° 55′ 10″ N. 122° 02′ 19″ E.	WVW	400	Government ..	**600**, 1,200	P G ..	0700 to 1930	0.30	—	
PORTO RICO										
Cayey	—	NZR	2,500	U.S. Navy ..	—	— [2]	—	—	—	[1] Operated by the United States Naval Communication Service, Radio Virginia
Ensenada, Porto Rico	17° 59′ 00″ N. 66° 57′ 00″ W.	NZX	150	U.S. Navy ..	300, **600**, 1,610	P G ..	N	0.30	—	[2] Trans-oceanic service
San Juan, Porto Rico [1]	18° 28′ 04″ N. 66° 05′ 38″ W.	NAU	200	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
PORTUGAL										
Lisbon (Cintra) ..	38° 47′ 11″ N. 9° 23′ 22″ W.	PQL	190	Government ..	300, 450, **600**	P G ..	N	0.40	—	[1] A direction finding service is carried out by this station when not engaged in official correspondence
Lisbon (Monsanto) ..	38° 44′ 00″ N. 9° 10′ 00″ W.	CTV	—	Navy	300, 450, **600**, 900, 1,200	O, D F [1]	—	—	—	
Porto (Leixões) ..	41° 10′ 35″ N. 8° 42′ 15″ W.	PQP	400	Government ..	300, **600**, 900, 1,200	P G ..	N	0.40	—	
PORTUGUESE EAST AFRICA										
Inhambane [1]	Province of Mozambique 23° 51′ 55″ S. 35° 22′ 50″ E.	CRY	300	Government ..	300, **600**	P G ..	0800 to 0000 [2]	0.60	—	[1] Station operated by the Postal and Telegraphical administration of the district of Mozambique [2] Mean time of the meridian 30° east of Greenwich
Lourenço Marques [1]	Province of Mozambique 25° 58′ 05″ S. 32° 35′ 39″ E.	CRZ	300	Government ..	300, **600**	P G [3] ..	N	0.60	—	[3] The station transmits daily, at 10.00 and 21.00, time signals and information concerning the meteorological conditions, furnished by the observatory of Campos Rodrigues (Lourenço Marques). (See International Time and Weather Signals)
Moçambique ..	Province of Mozambique 15° 01′ 47″ S. 40° 45′ 06″ E.	CRV	300	Government ..	300, **600**	P G ..	N	0.60	—	
PORTUGUESE GUINEA										
Bissao [1]	11° 52′ 00″ N. 15° 37′ 00″ W.	—	—	Government ..	300, 600, 1,200, 1,600	—	—	—	—	[1] Under construction

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
PORTUGUESE GUINEA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Bolamo [1]	11° 35′ 00″ N. 15° 30′ 00″ W.	—	—	Government	300, 600, 900	—	—	—	—	
Caio [1]	11° 50′ 00″ N. 16° 24′ 00″ W.	—	—	Government	300, 600, 900	—	—	—	—	
ROUMANIA										
Baneasa (Bucharest)	—	—	—	Government	—	—	—	—	—	[1] Public correspondence limited to the ships Dacia CVD, Imperatul Traian, Principesa Maria, Regele Carol I and Roumania [2] During the voyages of the Roumanian ships
Constantza-Tunnel	44° 10′ 32″ N. 28° 39′ 03″ E.	CVS	240	State Maritime Service	600	P R [1]	N [2]	0.15	1.50	
Herastreu (Bucharest)	—	—	—	Government	—	—	—	—	—	
Vaslui (Moldavia)	—	—	—	Government	—	—	—	—	—	
RUSSIA							Time of Petrograd [7]			
Anadyr	Behring Sea 64° 34′ 00″ N. 175° 35′ 00″ E.	RNR	130	—	300, 420, **600**	P G	1100 to 1900	0.60	—	[1] The coast station charge is reduced to fr. 0.13 per word for correspondence with Russian ship stations [2] The station communicates only with Nicolaiewsk RNL [3] The station also communicates by radiotelegraphy with Kerbinskaïa [4] The station is only open during the season of navigation [5] For radiotelegrams exchanged between the stations Rade de Taganrog and Taganrog, there is an additional charge of fr. 0.40 per radiotelegram, plus fr. 0.025 per word [6] The station is reserved for the service of the Gulf of Riga
Arkhangel	Mouth of the Dwina 64° 32′ 00″ N. 40° 30′ 00″ E.	RQA	250	—	300, 420, **600**	P G	0800 to 1000 1200 to 1400 2000 to 0000	0.60 [1]	—	
Batoum	Black Sea 41° 36′ 00″ N. 41° 40′ 00″ E.	REI	—	—	—	O	—	—	—	
Cracow	—	—	—	—	800, 2,000	O	—	—	—	
Fort d'Alexandrovsk	Coast of the Caspian Sea 44° 30′ 14″ N. 50° 16′ 40″ E.	RNF	160	—	300, 420, **600**	P G	0550 to 0950 1150 to 1550	0.60	—	
Hapsal	Esthonia 59° 00′ 00″ N. 23° 48′ 00″ E.	REC	—	—	—	O	—	—	—	
Helsingfors	60° 27′ 00″ N. 24° 57′ 00″ E.	REB	—	—	60	O		—	—	
Ker[illegible]	River Amgoun, a [illegible] of the Amur 52° 20′ 07.3″ N. 136° 29′ 18″ E.	RPN	170	—	—	— [2]	X	—	—	

Kerch	Crimea 45° 18′ 00″ N. 30° 27′ 00″ E.	REH	—	—	—	O ..	—	—	—	[4] Two hours in advance of Greenwich time [5] Temporarily controlled by British Admiralty [6] Transmits press and a meteorological message
Kronstadt	59° 59′ 00″ N. 29° 4[illegible]′ 00″ E.	REA	—	—	360	O ..	—	—	—	
Libau RED	56° 30′ 00″ N. 21° 05′ 00″ E.	RED	—	—	360	O ..	—	—	—	
Libau ROL	Baltic Sea 56° 31′ 40″ N. 20° 50′ 00″ E.	ROL	170	—	300, 420, 600	P G ..	0600 to 2200	0.60	—	
Mare-Sale	Kara Sea, Yalmal Peninsula 69° 42′ 59″ N. 66° 48′ 38″ E.	RTM	150	—	300, 420, 600	P G ..	0800 to 1000 1200 to 1400 2000 to 0000	0.60[1]	—	
Moscow	—	MSK	—	Government ..	5,000	—	—	—	—	
Naiakhan	Sea of Okhotsk 61° 33′ 00″ N. 159° 59′ 00″ E.	RNN	130	—	300, 420, 600	P G ..	1100 to 1900	0.60	—	
Nicolaïewsk RAU ..	On the Amur	RAU	—	—	—	O ..	—	—	—	
Nicolaiewsk RNL ..	Mouth of the Amur 53° 08′ 19.3″ N. 140° 42′ 54.4″ E.	RNL	240	—	300, 600	P G[3] ..	N	0.60	—	
Odessa	—	RAR	—	—	—	O ..	—	—	—	
Okhotsk	Sea of Okhotsk 59° 22′ 00″ N. 143° 20′ 00″ E.	ROT	130	—	300, 420, 600	P G ..	0500 to 2100	0.60	—	
Pétropavlovsk ..	Kamchatka 53° 00′ 10″ N. 158° 38′ 45″ E.	RPK	240	—	300, 600	P G ..	N	0.60	—	
Petrograd (Tsarskoe-Selo)	—	TSR	—	Government ..	—	—	—	—	—	
Pétrowsk Daghestan	Coast of the Caspian Sea 42° 59′ 20″ N. 47° 30′ 00″ E.	ROK	160	—	300, 420, 600	P G ..	0550 to 0950 1150 to 1550	0.60	—	
Posen..	—	—	—	—	800, 2,000	O ..	—	—	—	
Prest	Aland Islands 60° 16′ 00″ N. 20° 21′ 00″ E.	REF	—	—	360	O ..	—	—	—	
Rade d'Astrakhan ..	Caspian Sea 45° 15′ 00″ N. 47° 25′ 00″ E.	RQT	110	—	300, 420, 600	P G ..	0550 to 2150 1150 to 1550[4]	0.13	—	
Rade de Taganrog ..	Sea of Azov 46° 59′ 50″ N. 38° 14′ 10″ E.	ROE	110	—	300, 420, 600	P G[5] ..	0600 to 2200	0.60[1,5]	—	
Reval..	59° 20′ 00″ N. 24° 15′ 00″ E.	ROR	170	—	300, 420, 600	P G ..	0600 to 2200	0.60	—	
Riga	56° 59′ 53″ N. 24° 06′ 15″ E.	RRG	160	—	300, 420, 600	P G[6] ..	0600 to 2200	0.60	—	
Rouno	Gulf of Riga 57° 48′ 00″ N. 23° 15′ 40″ E.	RRN	70	—	300, 420, 600	P G ..	0800 to 1200 1400 to 1700 2000 to 2100	0.60	—	
Sébastopol	44° 37′ 00″ N. 33° 33′ 00″ E.	REG	—	—	360	O ..	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
	Meridian of Greenwich.							Francs.	Francs.	
RUSSIA—*contd.* Taganrog	Sea of Azov 47° 12′ 00″ N. 38° 48′ 00″ E.	RRT	170	—	300, 420, **600**	P G [2] ..	0600 to 2200	0.60 [1, 2]	—	
Vaigatch	Vaigatz Island Kara Strait 70° 23′ 46″ N. 58° 48′ 00″ E.	RTV	150	—	300, 420, **600**	P G ..	0800 to 1000 1200 to 1400 2000 to 0000	0.60 [1]	—	
Vladivostok RAS ..	43° 06′ 00″ N. 131° 54′ 00″ E.	RAS	—	—	1,200 approximately	O ..	—	—	—	
Vladivostok REJ ..	43° 06′ 49″ N. 131° 53′ 22″ E.	REJ	—	— [2]	360	O ..	—	—	—	
Warsaw	—	WAR	—	—	800, 2,000	O [2] ..	—	—	—	
Wiborg	61° 00′ 00″ N. 28° 49′ 00″ E.	RAW	—	—	1,200 approximately	O ..	—	—	—	
Yougorski-Char ..	Kara Sea, Jugor Strait 69° 49′ 07″ N. 60° 45′ 42″ E.	RTU	150	—	300, 420, **600**	P G ..	0800 to 1000 1200 to 1400 2000 to 0000	0.60 [1]	—	
SAINT HELENA										
St. Helena	15° 58′ 00″ S. 5° 45′ 00″ W.	BXH	—	Government ..	—	P G ..	—	0.60	—	
SALVADOR										
Las Lomas de Candelaria	—	—	—	Government ..	—	—	—	—	—	
SAMOA ISLANDS										
Apia	13° 51′ 00″ S. 171° 48′ 00″ W.	VMG	—	—	300, **600**	P G [1] ..	—	—	—	[1] The station is connected to the International telegraph system by wireless through Awanui Radio, New Zealand (normal route) or Suva, Fiji Islands (alternative route)
Tutuila	14° 00′ 00″ S. 171° 00′ 00″ W.	NPU	—	U.S. Navy ..	300, **600**, 750	P G [2] ..	N	0.30	—	[2] The station also communicates with fixed stations
SANDWICH IS. (See **HAWAIIAN ISLANDS**)										

SARAWAK										
Bintulu[2]	—	—	—	—	—	—	—	—	—	[1] Communicates with Singapore
Kuching	1° 33′ 00″ N. 110° 21′ 00″ E.	VQF	—	Government ..	—	P G[1 3] ..	0700 to 1700	—	—	[2] The station sends a time signal daily. (See International Time and weather Signals)
Miri	4° 32′ 00″ N. 114° 01′ 00″ E.	VQP	—	Government ..	—	P G ..	0700 to 1700	—	—	[3] Under construction.
Sadong	1° 07′ 00″ N. 110° 55′ 00″ E.	VQW	—	Government ..	—	P G ..	0700 to 1700	—	—	
Sibu	2° 25′ 00″ N. 111° 55′ 00″ E.	VQV	—	Government ..	—	P G ..	0700 to 1700	—	—	
SEYCHELLES										
Seychelles	Mahé 4° 40′ 00″ S. 55° 30′ 00″ E.	BZH	1,000	British Admiralty	600-2,000 (spark) 4,000 (arc)	P G ..	—	0.60	—	
SIAM										
Bangkok	13° 44′ 30″ N. 100° 32′ 00″ E.	HGA	300	Government ..	300, 600, 1,600, 1,800	—[1]	—	0.40	4.00	[1] The station is open for official correspondence. However, it accepts messages concerning the movements and security of ships exchanged between the captain of the ships and their owners or agents
Singora (Songkhlâ) ..	Gulf of Siam, Malay Peninsula 7° 12′ 00″ N. 100° 38′ 00″ E.	HGB	300	Government ..	300, 600, 1,600, 1,800	—[1]	—	0.40	4.00	
SIERRA LEONE										
Sierra Leone.. ..	8° 30′ 00″ N. 13° 14′ 00″ W.	VPU	250	African Direct Telegraph Co., Ltd.	300, 600	P G ..	Greenwich Time. 0700 to 2100 Sundays, 0800 to 1000 1600 to 1800	0.60	—	
SINGAPORE (See **MALAY PENINSULA**)										
SOLOMON ISLANDS										
Kieta..	Bougainville Island	VIU	—	Australian Government	—	P G[1] ..	—	0.60	—	[1] The station is connected to the International Telegraph System by wireless through Woodlark Island and Townsville Radio
Tulagi	Florida Island 9° 10′ 00″ S. 160° 15′ 00″ E.	VQJ	—	Australian Government	—	P G[1] ..	—	0.60	—	
SOUTH AFRICA (Union of)										
Capetown	34° 09′ 00″ S. 18° 19′ 00″ E.	VNC	350	Government ..	300, 600	P G[1 2] ..	N	0.60	—	[1] The station transmits each day, at 1 p.m., a report in plain language containing information

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
SOUTH AFRICA (**Union of**)—*contd.*										
Durban	29° 52′ 40″ S. 31° 03′ 50″ E.	VND	250	Government ..	300, **600**	P G[1] ..	N	0.60	—	concerning the meteorological conditions prevailing on the whole coast of the union of South Africa
Durban (Jacobs) ..	29° 50′ 00″ S. 30° 56′ 00″ E.	BZI	1,000	British Admiralty	600–2,000 (spark) 4,000 (arc)	O ..	—	—	—	[2] The station transmits a time signal each day. (See International Time and Weather Signals.)
Port Nolloth.. ..	29° 16′ 00″ S. 16° 52′ 00″ E.	BZJ	1,000	British Admiralty	600–2,000 (spark) 4,000 (arc)	O ..	—	—	—	
SPAIN										
Almeria	36° 51′ 00″ N. 2° 31′ 15″ W.	EGA	220	Army	600, **900**	O ..	N	—	—	[1] Opened provisionally
Aranjuez	40° 01′ 48″ N. 3° 40′ 32″ W.	EAA	430	Compania Nacional de T.S.H.	300, **600**, 2,130	P G[3] ..	N	0.45	4.50	[2] Under construction [3] The station transmits only correspondence of the Compania Transatlantica
Barcelona EAB ..	41° 18′ 42″ N. 2° 06′ 28″ E.	EAB	430	Compania Nacional de T.S.H.	300, **600**, 2,300	P G ..	N	0.45	4.50	
Barcelona EGE ..	41° 23′ 08″ N. 2° 03′ 52″ E.	EGE	430	Army	600, 1,000, 1,600	O ..	N	—	—	[4] The working of the station is temporarily suspended
Bilbao	43° 23′ 53″ N. 2° 55′ 34″ W.	EGH	320	Army	600, 1,200, 1,600	O ..	N	—	—	[5] High-power interior station open for transcontinental public correspondence
Cabo de Palos ..	Murcia 37° 38′ 00″ N. 0° 40′ 00″ W.	EAP	200	Compania Nacional de T.S.H.	300, **600**, 1,800	P G ..	N	0.45	4.50	
Cabo Finisterre[1] ..	42° 52′ 40″ N. 9° 16′ 18″ W.	EAF	210	Compania Nacional de T.S.H.	300, **600**, 1,800	P G ..	N	0.45	4.50	
Cabo Mayor ..	Santander 43° 30′ 00″ N. 3° 48′ 30″ W.	EAS	108	Compania Nacional de T.S.H.	300, **600**, 1,300	P G ..	N	0.45	4.50	
Cadiz EAC	36° 29′ 45″ N. 6° 16′ 14″ W.	EAC	860	Compania Nacional de T.S.H.	300, **600**, 2,540	P G ..	N	0.45	4.50	
Cadiz	36° 31′ 30″ N. 6° 17′ 42″ W.	—	6	—	70	P[2] ..	—	—	—	
Cartagena	37° 35′ 36″ N. 0° 59′ 18″ W.	EBX	210	Navy	600, 900, 1,000, 1,200, 1,600	O ..	N	—	—	
Coruña	43° 21′ 29″ N. 8° 24′ 13″ W.	EGJ	430	Army	600, 1,200, 1,600	O ..	N	—	—	
Guadalajara ..	40° 38′ 00″ N. 3° 10′ 00″ W.	EGZ	54	Army	900	O ..	X	—	—	
Huelva	—	—	—	Compania Nacional de T.S.H.	—	—	—	—	—	

La Carraca	Gulf of Cadiz 36° 29′ 30″ N. 6° 10′ 50″ W.	CLZ	60	Navy	300, 600, 1,200	O ..	N	—	—	
Le Ferrol [3]	43° 28′ 52″ N. 8° 14′ 05″ W.	EBW	440	Navy	600, 900, 1,200, 1,600, 1,800	O ..	N	—	—	
Madrid EBZ.. ..	40° 25′ 00″ N. 3° 43′ 00″ W.	EBZ	15	Navy	225, 300	O ..	N	—	—	
Madrid EGC ..	40° 24′ 30″ N. 3° 50′ 30″ W.	EGC	540	Army	600, 900, 1,600, 2,000, 2,500	O ..	N	—	—	
Mahon	Minorca 39° 52′ 29″ N. 4° 22′ 39″ E.	EGI	320	Army	600, 1,200, 1,600	O ..	N	—	—	
Malaga	36° 43′ 00″ N. 4° 24′ 00″ W.	EGM	—	Compania Nacional de T.S.H.	—	—	—	—	—	
Matagorda	Gulf of Cadiz 36° 31′ 30″ N. 6° 14′ 54″ W.	—	6	—	70	P [3] ..	—	—	—	
San Fernando Cadiz	—	EBY	—	—	—	O ..	N	—	—	
Sóller	Majorca 39° 45′ 15″ N. 2° 45′ 40″ E.	EAO	270	Compania Nacional de T.S.H.	300, 600	P G ..	N	0.45	4.50	
Valencia	39° 27′ 10″ N. 0° 22′ 46″ W.	EGG	320	Army	600, 1,200, 1,600	O ..	N	—	—	
Vigo [4]	42° 15′ 00″ N. 8° 40′ 00″ W.	EAV	430	Compania Nacional de T.S.H.	300, 600, 2,900	P G [4] ..	N	0.45	4.50	
SPITZBERGEN							Central European Time.			
Spitzbergen	Green Harbour 78° 02′ 26″ N. 14° 14′ 27″ E.	LFG	400	Government ..	300, 600	P G ..	N [1] 0800 to 2100 [2]	0.40	4.00	[1] From June 15th to September 30th [2] From October 1st to June 14th
Calypso Bay ..	—	—	—	Northern Exploration Co.	600, 800, 1,000	P ..	—	—	—	
SUDAN (See **EGYPT**)										
SWAN ISLAND										
Swan Island ..	—	US	—	United Fruit Co...	—	— [1]	—	—	—	[1] Acts as a relay station for Belize, British Honduras, for traffic intended for United States and United Kingdom
SWEDEN										
Boden	65° 50′ 10″ N. 21° 39′ 00″ E.	SAI	200	State Telegraphs	300, 600	P G ..	N [1]	0.30	3.00	[1] The station is closed, when by reason of ice, navigation is suspended in the Gulf of Bothnia
Gothenburg (Göteborg)	57° 41′ 05″ N. 11° 53′ 46″ E.	SAB	350	State Telegraphs	300, 600	P G ..	N [1]	0.30	3.00	
Härnösand	62° 44′ 12″ N. 18° 07′ 50″ E.	SAH	350	State Telegraphs	300, 600	P G ..	N [1]	0.30	3.00	[2] The station is intended for the transmission to the Karlskrona coast station of telegrams received by
Karlskrona	56° 09′ 10″ N. 15° 35′ 30″ E.	SAA	420	Marine Dept. ..	300, 600	P G ..	N	0.30	3.00	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.	
								Per Word.	Minimum Charge.
SWEDEN—*contd.*	Meridian of Greenwich.								
Ölandsrev Lightship	Near the extreme south of Öland 56° 07′ 00″ N. 16° 34′ 00″ E.	SAG	55	—	300, 450, **600**	—[1]	X	Francs. —[2]	Francs. —[2]
Oscar-Fredriksborg . .	Near Stockholm 59° 23′ 48″ N. 18° 26′ 42″ E.	SAD	50	Marine Dept. . .	300, **600**	P G . .	—	0.30	3.00
Tingstäde	Gothland 57° 43′ 50″ N. 18° 35′ 30″ E.	SAE	420	Marine Dept. . .	300, **600**	P G . .	N	0.30	3.00
Trälleborg	55° 22′ 10″ N. 13° 09′ 45″ E.	SAC	250	State Railways . .	300, **375**, 600	P R[4], O[5]	N	0.30	3.00
Vaxholm	59° 24′ 18″ N. 18° 22′ 36″ E.	SAF	350	State Telegraphs	300, **600**	P G . .	N	0.30	3.00
TAHITI									
Papeete, Ile Tahiti . .	17° 29′ 30″ S. 149° 29′ 15″ W.	FOP	600[1] 1,000[2]	Government . .	**600**, 2,000, 2,500[3]	P G[4,5,6]	Local Time.[7] 0000 to 0200 0400 to 0500 1930 to 0000[8] Sundays and holidays: 0000 to 0200 0400 to 0500 0800 to 0900 1930 to 0000[9]	0.60	—
TOBAGO (West Indies)									
Tobago	11° 12′ 00″ N. 60° 40′ 00″ W.	VPM	250	Government . .	600	P G[10] . .	Local Time. 0800 to 1700 Sundays and holidays: 0800 to 1200	0.60[11]	—
TONGA ISLANDS									
Nukualofa[10]	—	—	—	—	—	—	—	—	—

Remarks.

means of flag signals from ships passing within sight or the retransmission by means of these signals, to such ships, of telegrams sent to it through the Karlskrona coast station

[2] Telegrams originating on or intended for ships and forwarded through Karlskrona are subject to the coast charge of Karlskrona, the charge for transmission over the inland telegraph lines and a fixed charge of 1 fr. per radiotelegram

[4] Public correspondence with the ferry boats of the Sassnitz-Trälleborg Line

[5] Official correspondence with Sassnitz and with the ferry boats of the Sassnitz-Trälleborg Railway Line, concerning the railway traffic

[1] With 600 m. wave

[2] With 2,000 m. wave

[3] The wave-lengths of 2,000 and 2,500 m. are used for messages exchanged with Apia (Samoa Is.) every day from 7.30 p.m. until completion of traffic

[6] Meteorological reports and navigation notices are transmitted twice daily at 1100 and 2300. (See International Time and Weather Signals.)

TONQIN (French Indo-China)									
Baolac [14]	—	—	—	—	—	—	—	—	—
Caobang [14]	—	—	—	—	—	—	—	—	—
Ha-Chiang [14]	22° 53′ 00″ N. 104° 57′ 00″ E.	—	—	—	—	—	—	—	—
Hanoi	21° 03′ 49″ N. 105° 54′ 18″ E.	FAO	1,000	Government ..	300, 600, 1,800, 2,400, 3,000	P G [18], O	0700 to 1100 1400 to 1700	0.25	2.00
Kien-An	Near Haiphong 20° 48′ 34″ N. 106° 41′ 59″ E.	FKA	350	Government ..	300, 600, 1,800	P G, O ..	0700 to 1100 1400 to 1700	0.25	2.00
Langson [14]	21° 48′ 00″ N. 106° 40′ 00″ E.	—	—	—	—	—	—	—	—
Lao-Kai [14]	22° 35′ 00″ N. 104° 00′ 00″ E.	—	—	—	—	—	—	—	—
Moncay [14]	21° 25′ 00″ N. 107° 55′ 00″ E.	—	—	—	—	—	—	—	—
TRINIDAD (West Indies)									
Trinidad	10° 40′ 00″ N. 61° 30′ 00″ W.	VPL	400	Government ..	600	P G [15] ..	N	0.60 [16]	—
TRIPOLI									
Bengasi Radio ..	32° 06′ 14″ N. 20° 03′ 15″ E.	ICJ	160	Government ..	300, 600	P G ..	N	0.30	—
Derna Radio ..	32° 44′ 54″ N. 22° 39′ 46″ E.	ICO	270	Government ..	300, 600	P G ..	N	0.30	—
Tobruk Radio ..	32° 03′ 30″ N. 24° 00′ 00″ E.	ICU	270	Government ..	300, 600	P G ..	N	0.30	—
Tripoli Radio ..	32° 52′ 40″ N. 13° 11′ 40″ E.	ICK	160	Government ..	300, 600	P G ..	N	0.30	—
TUNIS									
Bizerte	In Sidi Abdallah 37° 16′ 00″ N. 9° 49′ 00″ E.	FUA	—	French Navy ..	—	O ..	Central European Time.[17] 0900 to 0000	—	—
Cap-Bon	37° 04′ 48″ N. 11° 02′ 23″ E.	FFT	100	French Navy ..	300, 600	P G ..	0700 to 2200	0.40 [18]	—

[5] Connected to the International Telegraph System by wireless through Apia (Samoa Is.) and Awanui Radio, New Zealand

[6] The station also communicates with Tutuila, using 600 m. wave

[7] Meridian 150° west of Greenwich

[8] The station also listens from 0900 to 0915, 1000 to 1015, 1100 to 1115, 1500 to 1515, 1600 to 1615, 1700 to 1715

[9] The hours are extended during the passage of the regular steamers or in case of necessity

[10] The station also exchanges public and official correspondence with Trinidad

[11] In the case of radiotelegrams originating at or intended for Port of Spain (Trinidad) or Scarborough (Tobago), the charge for transmission between these places and the coast station is included in the coast tax

[12] Under construction

[13] Meteorological telegrams are transmitted at 09.30

[14] Under construction

[15] The station also exchanges public and official correspondence with Tobago

[16] In the case of radiotelegrams originating at or intended for Port of Spain (Trinidad) or Scarborough (Tobago), the charge for transmission between these places and the coast station is included in the coast tax

[17] One hour in advance of Greenwich time

[18] The coast charge is reduced to fr. 0.15 per

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
TURKEY										
Constantinople (Ok Meiddan)	41° 02′ 00″ N. 28° 58′ 00″ E.	—	—	—	600, 2,000	—	—	—	—	word for correspondence with ships engaged in a regular service between France on the one hand, and Corsica, Algeria, and Tunis on the other
UNITED KINGDOM										
Aberdeen	57° 08′ 30″ N. 2° 07′ 00″ W.	BYD	—	Admiralty ..	—	O ..	—	—	—	
Amlwch [1, 21]	53° 24′ 28″ N. 4° 18′ 20″ W.	BXV	—	Admiralty ..	450	D F [1] ..	—	—	—	
Ballybunion ..	Ireland, Co. Kerry	YXQ	—	—	—	P ..	—	—	—	
Ballycastle, Antrim..	Ireland, North Channel 55° 11′ 00″ N. 6° 12′ 00″ W.	GSL	15	Post Office ..	250	—[2]	0825 to 2025	—	—	
Berwick [1, 3]	55° 41′ 48″ N. 1° 53′ 40″ W.	BVG	—	Admiralty ..	450	D F [1] ..	—	—	—	
Broomfield, Essex ..	51° 45′ 00″ N. 0° 28′ 00″ E.	MAX	—	Marconi Co. ..	—	—[22]	—	—		
Bunbeg	North-west coast of Ireland 55° 04′ 00″ N. 8° 09′ 00″ W.	BYR	—	Admiralty ..	600, 800	O [20] ..	—	—	—	
Butt of Lewis ..	6° 14′ 00″ W. 58° 32′ 00″ N.	—	—	Lloyd's	—	P ..	—	—	—	
Caister-on-Sea ..	Near Yarmouth 52° 37′ 00″ N. 1° 42′ 00″ E.	GCS	—	Post Office ..	**1,000**	—[20]	—	—	—	
Carnarvon	53° 07′ 25″ N. 4° 11′ 32″ W.	MUU	—	Marconi Co. ..	14,500	—[24]	N	—	—	
Carnsore [1]	52° 11′ 50″ N. 6° 21′ 00″ W.	BVZ	—	Admiralty ..	450	D F [1] ..	—	—	—	
Chelmsford	51° 43′ 45″ N. 0° 28′ 38″ E.	MZX	—	Marconi Co.	—	—[22]	—	—	—	
Cleethorpes	South-east of Grimsby 53° 31′ 00″ N. 0° 02′ 00″ W.	BYB	—	Admiralty	3,000	O ..	—	—		

[1] Independent direction finding station

[2] Special correspondence, including official and ordinary telegrams exchanged with Rathlin Island

[3] Peterhead, Berwick and Flamborough direction finding stations are linked together by special landline, enabling any one to control the other two if required

[4] At the present the handling of public correspondence has been suspended

[5] This coast tax applies to messages exchanged with all ships except those engaged on short voyages and where special arrangements have been made with the Postmaster-General for a reduced coast tax. (See notes 6 and 7.) In the case of telegrams originating in or intended for the United Kingdom the combined coast and land line charge is fr. 0.69 per word

Clifden	West Coast of Ireland 53° 26′ 48″ N. 10° 01′ 09″ W.	MFT	—	Marconi Co.	6,500	—[11]	—	—	—	[6] This coast tax applies to messages exchanged with certain vessels making regular voyages of more than 200 miles, but not exceeding 1,000 miles and where special arrangements have been made with the Postmaster-General for the application of such tax. In the case of radiotelegrams originating in or intended for the United Kingdom, the combined coast and land line charge is fr. 0.42 per word, with a minimum of fr. 4.20 per radiotelegram
Corkbeg	Entrance to the Port of Cork 51° 49′ 00″ N. 8° 15′ 00″ W.	BYQ	—	Admiralty	**600**, 800	O	—	—	—	[7] This coast tax applies to messages exchanged with certain ships making regular voyages of 200 miles or less, and where special arrangements have been made with the Postmaster-General for the application of such tax. In the case of messages originating in or intended for the United Kingdom, the combined coast and land line charge is fr. 0.26 per word, with a minimum of fr. 2.60 per radiotelegram
Cromarty	Black Isle 57° 41′ 45″ N. 4° 01′ 30″ W.	BYP	—	Admiralty	—	O	—	—	—	[8] Reception and transmission of distress signals
Crookhaven	South Coast of Ireland 51° 27′ 00″ N. 9° 46′ 00″ W.	GXO	250	Post Office	300	—[12]	—	—	—	[9] A fixed charge is made of fr. 1 per radiotelegram in addition to the ordinary telegraph charges
Cross Sand Lightship	North-east of Yarmouth 52° 38′ 00″ N. 1° 54′ 00″ E.	GVA	15	Trinity House	230	—[8]	N	—[9]	—	[10] Correspondence restricted to messages exchanged with the steamers of the South Eastern and Chatham Railway Company
Cullercoats	Near Tynemouth 55° 02′ 00″ N. 1° 26′ 00″ W.	GCC	250	Post Office	300, **600**	P G	N	0.60[5] 0.33[6] 0.17[7]	— 3.30[6] 1.70[7]	[11] Correspondence restricted to ships of the Midland Railway Company
Culver Cliff	Isle of Wight 50° 40′ 00″ N. 1° 06′ 00″ W.	BYM	—	Admiralty	220, 600, 800, **1,000**	O	—	—	—	[12] During the passage of the steamers between Heysham and Belfast
Dover	51° 07′ 00″ N. 1° 18′ 00″ E.	BYL	—	Admiralty	—	O	—	—	—	[13] The wave-length of
East Goodwin Lightship	Straits of Dover 51° 13′ 00″ N. 1° 36′ 00″ E.	GVB	15	Trinity House	230	—[8]	N	—[9]	—	
Fastnet	51° 23′ 00″ N. 9° 36′ 00″ W.	GNJ	100	Lloyd's	**800**	P[14]	—	—	—	
Felixstowe	Near Harwich 51° 57′ 00″ N. 1° 20′ 00″ E.	BYJ	—	Admiralty	—	O	—	—	—	
Fishguard	Pembrokeshire 51° 59′ 00″ N. 4° 58′ 00″ W.	GRL	200	Post Office	300, **600**	P G	N	0.60[5] 0.33[6] 0.17[7]	— 3.30[6] 1.70[7]	
Flamborough[13]	54° 07′ 05″ N. 0° 04′ 58″ W.	BVN	—	Admiralty	450	D F[1]	—	—	—	
Flannan Islands	58° 17′ 00″ N. 7° 33′ 00″ W.	—	—	Lloyd's	—	P[14]	—	—	—	
Folkestone Harbour	Straits of Dover 51° 04′ 30″ N. 1° 11′ 30″ E.	GUR	45	South Eastern and Chatham Railway	**800**, 600	P[10]	—	—	—	
Grimsby	53° 35′ 00″ N. 0° 04′ 00″ W.	BYV	100	Post Office	300, **600**	P G[20]	N	0.60 0.33[6] 0.17[7]	— 3.30[6] 1.70[7]	
Guernsey	Channel Islands 49° 27′ 00″ N. 2° 33′ 00″ W.	GKA	—	Post Office	—	—[20]	—	—	—	
Gull Lightship	51° 16′ 00″ N. 1° 28′ 00″ E.	GVC	15	Trinity House	230	—[8]	N	—[9]	—	
Harwich BVH	51° 57′ 00″ N. 1° 15′ 00″ E.	BVH	—	Admiralty	—	O	—	—	—	

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED KINGDOM —*contd.*								Francs.	Francs.
Harwich BWH ..	Meridian of Greenwich. 51° 57′ 00″ N. 1° 15′ 00″ E.	BWH	—	Admiralty ..	—	O ..	—	—	—
Heysham Harbour ..	Morecambe Bay 54° 02′ 00″ N. 2° 55′ 00″ W.	GKG	150	Midland Railway	400	P [11] ..	N [13]	—	—
Horsea	Near Portsmouth 50° 50′ 30″ N. 1° 06′ 00″ W.	BYC	—	Admiralty ..	3,000, 4,500	O ..	—	—	—
Immingham ..	53° 37′ 00″ N. 0° 11′ 00″ W.	BZU	—	Admiralty ..	—	O ..	—	—	—
Inchkeith	Firth of Forth 56° 02′ 00″ N. 3° 09′ 00″ W.	BZA	—	Admiralty ..	600	O ..	—	—	—
Inishtrahull	55° 25′ 00″ N. 7° 13′ 00″ W.	GQM	100	Lloyd's	300	P [16] ..	—	—	—
Ipswich	52° 05′ 00″ N. 1° 09′ 00″ E.	BYE	—	Admiralty ..	—	O ..	—	—	—
Kingsnorth	51° 25′ 00″ N. 0° 36′ 00″ E.	BZS	—	Admiralty ..	—	O ..	—	—	—
Kingstown	53° 17′ 00″ N. 6° 08′ 00″ W.	BWK	—	Admiralty ..	—	O ..	—	—	—
Land's End	West Coast of Cornwall 50° 07′ 00″ N. 5° 40′ 10″ W.	GLD	250	Post Office ..	300, **600**	P G ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
Larne [1]	54° 51′ 15″ N. 5° 48′ 15″ W.	BXJ	—	Admiralty ..	450	D F [1] ..	—	—	—
Leafield	51° 50′ 11″ N. 1° 33′ 42″ W.	—	—	Marconi Co. ..	—	P ..	—	—	—
Lerwick	Shetland Islands 60° 09′ 00″ N. 1° 11′ 00″ W.	BYU	150	Admiralty ..	800, **600**	P G [20] ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
Lizard [1]	49° 59′ 07″ N. 5° 12′ 18″ W.	BVY	—	Admiralty ..	450	D F [1] ..	—	—	—
Lochboisdale ..	Hebrides 57° 08′ 00″ N. 7° 16′ 00″ W.	GCB	150	Post Office ..	300	O [22] ..	0800 to 2000 Weekdays only	—	—
Malin Head [20] ..	North Coast of Ireland 55° 22′ 00″ N. 7° 21′ 00″ W.	GMH	250	Post Office ..	300, **600**	P G ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]

Remarks.

600 metres is used solely for communication with Scheveningen-Port. Such communication takes place only in the case of urgent need.

[14] Communication restricted to the ships of the Great Eastern Railway Company

[15] During the passage of the steamers

[16] Correspondence restricted to ships at sea when out of range of any other British coast station; weather report transmitted at 0930 and 2130

[17] Special correspondence, including official and ordinary telegrams exchanged with Ballycastle, Antrim

[18] Dependent direction finding station controlled by Amlwch

[19] Dependent direction finding station controlled by Malin Head

[20] Transmitting station for "Seaview" direction finding station

[21] Transmitting station for Rhyl direction finding station

[22] Special correspondence, including official and ordinary correspondence exchanged with Lochboisdale

[23] Experimental station

[24] Trans-ocean service

Marconi House	London 51° 30′ 40″ N. 0° 07′ 10″ W.	—	—	Marconi Co. ..	—	P ..	—	—	—
Newhaven	50° 48′ 00″ N. 0° 01′ 00″ E.	GNV	120	London, Brighton and S.C. Railway	400	O ..	1000 to 1400 2030 to 2330	—	—
Niton	Isle of Wight 50° 34′ 30″ N. 1° 17′ 10″ W.	GNI	150	Post Office ..	300, 600	P G ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
North Foreland ..	North of Ramsgate 51° 23′ 00″ N. 1° 26′ 00″ E.	GNF	150	Post Office ..	300, 600	P G ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
Parkeston Quay ..	Near Harwich 51° 56′ 00″ N. 1° 15′ 00″ E.	GPQ	130	Great Eastern Railway	450, 600 [13]	P [14] ..	N [15]	—	—
Pembroke	51° 41′ 00″ N. 4° 58′ 00″ W.	BYF	—	Admiralty ..	—	O ..	—	—	—
Peterhead [13]	57° 33′ 30″ N. 1° 49′ 05″ W.	BVL	—	Admiralty ..	450	D F [1] ..	—	—	—
Poldhu	Extreme South-west of England 50° 01′ 44″ N. 5° 15′ 44″ W.	MPD	1,000	Marconi Co. ..	2,800	P R [16] ..	—	3.00	—
Poole (The Haven) ..	50° 40′ 00″ N. 1° 56′ 00″ W.	MHH	—	Marconi Co. ..	—	— [25]	—	—	—
Portland Bill ..	English Channel Isle of Portland 50° 32′ 00″ N. 2° 27′ 00″ W.	BYN	—	Admiralty ..	600, 800	O [30] ..	—	—	—
Portpatrick	Scotland, North Channel 54° 50′ 00″ N. 5° 09′ 00″ W.	BYS	—	Post Office ..	300, 600	P G [30] ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
Portsmouth Signal School	50° 48′ 00″ N. 1° 06′ 00″ W.	BZC	—	Admiralty ..	—	O ..	—	—	—
Rame Head	Entrance to the port of Plymouth 50° 19′ 00″ N. 4° 13′ 00″ W.	BYO	—	Admiralty ..	600, 800	O ..	—	—	—
Rathlin Island ..	North Channel 55° 17′ 00″ N. 6° 10′ 00″ W.	GRN	15	Post Office ..	250	— [17]	0825 to 2025	—	—
Rhyl [18]	53° 18′ 20″ N. 3° 28′ 50″ W.	BZW	—	Admiralty ..	450	D F [18] ..	—	—	—
Rosyth	West of Edinburgh 56° 01′ 00″ N. 3° 23′ 00″ W.	BYH	—	Admiralty ..	—	O ..	—	—	—
Scarborough ..	54° 16′ 00″ N. 0° 26′ 00″ W.	BYI	—	Admiralty ..	—	O ..	—	—	—
Seaforth	Liverpool 53° 28′ 00″ N. 3° 01′ 00″ W.	GLV	150	Post Office ..	300, 600	P G ..	N	0.60 [5] 0.33 [6] 0.17 [7]	— 3.30 [6] 1.70 [7]
Seaview [19]	55° 22′ 00″ N. 7° 19′ 25″ W.	BXK	—	Admiralty ..	450	D F [19] ..	—	—	—

[25] Trans-Atlantic service communicates with Glace Bay (Nova Scotia)
[26] For signal duty
[27] Trans-Atlantic receiving station only
[28] Trans-ocean receiving station
[29] Communicates only with fixed stations
[30] Station temporarily closed

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge.		Remarks.
								Per Word.	Minimum Charge.	
	Meridian of Greenwich.							Francs.	Francs.	
UNITED KINGDOM —*contd.*										
Sheerness	Mouth of the Thames 51° 27′ 00″ N. 0° 45′ 00″ E.	BYK	—	Admiralty ..	—	O ..	—	—	—	
South Goodwin Lightship	Straits of Dover 51° 09′ 00″ N. 1° 28′ 00″ E.	GVD	15	Trinity House ..	230	—[8]	N	—[8]	—	
Stockton	Near Middlesbrough 54° 34′ 00″ N. 1° 21′ 00″ W.	BYT	—	Admiralty ..	—	O[30] ..	—	—	—	
Stonehaven	56° 56′ 00″ N. 2° 20′ 00″ W.	GSW	900 250	Post Office ..	300, 600, 1,800, 5,000	O ..	—	—	—	
Sunk Lightship ..	South-east of Harwich 51° 51′ 00″ N. 1° 30′ 00″ E.	GVE	30	Trinity House ..	230	—[8]	N	—[8]	—	
Tobermory	Isle of Mull 56° 36′ 00″ N. 6° 04′ 00″ W.	GCA	150	Post Office ..	300	—[22 28]	0800 to 2000	—	—	
Tongue Lightship ..	North of Margate 51° 30′ 00″ N. 1° 23′ 00″ E.	GVF	15	Trinity House ..	230	—[8]	N	—[8]	—	
Towyn	—	MUV	—	Marconi Co. ..	—	—[28]	—	—	—	
Tynemouth	55° 31′ 00″ N. 1° 26′ 00″ W.	BZT	—	Admiralty ..	—	O ..	—	—	—	
Valentia	South-west of County Kerry 51° 55′ 00″ N. 10° 19′ 00″ W.	GCK	250	Post Office ..	300, **600**	P G ..	N	0.60[5] 0.33[6] 0.17[7]	— 3.30[6] 1.70[7]	
Whitehall, London ..	51° 30′ 00″ N. 0° 10′ 00″ W.	BYA	—	Admiralty ..	—	O ..	—	—	—	
Wick	North coast of Scotland 58° 26′ 00″ N. 3° 06′ 00″ W.	BYG	—	Post Office ..	300, **600**	P G[30] ..	N	0.60[5] 0.33[6] 0.17[7]	— 3.30[6] 1.70[7]	

UNITED STATES OF AMERICA									
Akron, Ohio ..	41° 10′ 00″ N. 81° 40′ 00″ W.	WOI	350	Goodyear Tire and Rubber Co.	300, 600, 2,000	—[11]	0800 to 1630[10]	—	—
Alpena	Michigan 45° 03′ 00″ N. 83° 30′ 00″ W.	NSM	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Ambrose Channel LightVessel(No.87)	New York 40° 36′ 00″ N. 74° 03′ 00″ W.	NALS	—	U.S. Navy ..	600	P G ..	N	—	—
Anacostia NOF, District of Columbia[1]	—	NOF	—	U.S. Navy ..	—	O ..	X	—	—
Anacostia NSF, District of Columbia[3]	—	NSF	—	U.S. Navy ..	300, 600	P G[3] ..	N	0.30	—
Anastasia Isle, Florida[4]	North-east coast of Florida 29° 53′ 20″ N. 81° 17′ 05″ W.	NAP	—	U.S. Navy ..	300, 600	P G[3] ..	N	0.30	—
Anderson, Virginia[9]	Fort Monroe	WZM	—	U.S. Army ..	—	O ..	—	—	—
Annapolis, Maryland NSS	38° 59′ 00″ N. 76° 27′ 00″ W.	NSS	—	U.S. Navy ..	—	—[66 67]	—	—	—
Annapolis, Maryland NAK[4]	Chesapeake Bay 38° 59′ 00″ N. 76° 29′ 12″ W.	NAK	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Appledore Island[5] ..	Maine 42° 59′ 12″ N. 70° 36′ 42″ W.	NTW	—	U.S. Navy ..	800	D F[6] ..	—	—	—
Ashtabula[4]	Ohio 41° 50′ 00″ N. 80° 50′ 00″ W.	NQB	125	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Astoria, Oregon[4] ..	46° 11′ 00″ N. 123° 51′ 00″ W.	NUZ	300	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Avalon, California[4] ..	S. Catalina Island 33° 21′ 00″ N. 118° 20′ 00″ W.	NZL	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Baltimore, Maryland[4]	39° 17′ 22″ N. 76° 36′ 41″ W.	NBZ	125	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Bar Harbour[4] ..	Maine	NBD	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Bar Harbour[12] ..	Maine 44° 18′ 36″ N. 68° 11′ 27″ W.	NBD	—	U.S. Navy ..	800	D F[12] ..	—	—	—
Beaufort, North Carolina[4]	34° 43′ 12″ N. 76° 40′ 21″ W.	NAN	100	U.S. Navy ..	300, 600	P G[8] ..	N	0.30	—
Belmar	New Jersey	WII	—	Marconi Co. of America	—	—[66]	N	—	—
Benton Harbour[4] ..	Michigan 42° 06′ 42″ N. 86° 28′ 21″ W.	NUF	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Bethany Beach, Delaware[6]	38° 32′ 45″ N. 75° 03′ 20″ W.	NSD	—	U.S. Navy ..	800	D F[6] ..	—	—	—
Binghamton ..	New York 42° 08′ 00″ N. 75° 55′ 00″ W.	WBT	150	Delaware, Lackawanna & Western Railroad Co.	1,610	—[60]	X	—	—

[1] Instructional and experimental

[2] Air station, also open to public correspondence

[3] Information of navigational interest is transmitted by the U.S. Naval coast stations at 0800, 1200, 1600, and 2000 on wave-lengths of 600 metres and 1,000 metres. (See International Time and Weather Signals for full particulars)

[4] Operated by the United States Naval Communication Service, Radio, Virginia

[5] Independent direction finding station

[6] Direction finding station. Transmission and control by Cape May (NSD)

[7] This station only communicates with Koko Head NPM (Hawaiian Islands)

[8] In the case of failure of the Washington NAA high-power station, the time signals are sent out by the small set and the Boston NAD, Newport NAF (Rhode Island), New York NAH, Norfolk (Virginia), and Charleston (South Carolina) stations, are notified, and they each send the time signals broadcast daily at noon (Sundays and holidays excepted)

[9] Training school station. Operated by the Coast Artillery Corps, United States Army, Washington, D.C.

[10] Direction finding station. Transmission conducted by Cape Cod NAE

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.
Blunts Reef Light Vessel (No. 83)	—	NACT	—	U.S. Navy ..	600	P G ..	N	—	—
Bolinas, California ..	37° 54′ 48″ N. 122° 43′ 33″ W.	NZP	3,500	Marconi Co. of America	—	—[7]	N	—	—
Boston[4]	Massachusetts 42° 22′ 24″ N. 71° 03′ 24″ W.	NAD	200	U.S. Navy ..	300, **600**	P G[12]	N	0.30	—
Boston Light Vessel (No. 54)	Massachusetts 42° 20′ 00″ N. 71° 03′ 00″ W.	NADX	—	U.S. Navy ..	600	P G ..	N	—	—
Brenton Reef Light Vessel (No. 39)	Rhode Island 41° 25′ 00″ N. 71° 22′ 00″ W.	NASB	—	U.S. Navy ..	600	P G ..	N	—	—
Brooklyn[4]	New York 40° 42′ 00″ N. 73° 59′ 00″ W.	NAH	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Brownsville, Texas ..	—	WUZ	250	U.S. Army ..	1,000	O ..	X	—	—
Brunswick	Georgia	NOS	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Brunswick Light Vessel (No. 84)	31° 00′ 00″ N. 81° 09′ 00″ W.	NABX	—	U.S. Navy ..	600	P G ..	N	—	—
Buckroe[9]	Virginia, Fort Monroe	WZL	—	U.S. Army ..	—	O ..	—	—	—
Buffalo, New York[4]	42° 52′ 49″ N. 78° 52′ 36″ W.	NNZ	185	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Bull Island, South Carolina	—	NZY	—	U.S. Navy ..	800	D F[8] ..	—	—	—
Burrwood[4]	Louisiana 28° 58′ 04″ N. 89° 22′ 45″ W.	NBX	400	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Calumet, Michigan[4] ..	47° 15′ 12″ N. 88° 27′ 12″ W.	NUG	150	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Canton, Ohio ..	40° 48′ 00″ N 81° 22′ 00″ W.	WQP	100	Henry L. Ley ..	500	—[21]	X	—	—
Cape Charles Light Vessel (No. 101)	Virginia 37° 05′ 00″ N. 75° 43′ 00″ W.	NAJV	—	U.S. Navy ..	600	P G ..	N	—	—
Cape Cod[4]	Massachusetts 42° 02′ 22″ N. 70° 03′ 54″ W.	NAE	—	U.S. Navy ..	300, **600**	P.G ..	N	0.30	—

Remarks.

[11] Direction finding station. Transmission conducted by Cape Hatteras NDW

[12] Direction finding station. Transmission conducted by Bar Harbour NBD

[13] Direction finding station. Transmission conducted by Cape May NSD (New Jersey)

[14] Direction finding station. Transmission conducted by Virginia Beach NCZ

[15] Direction finding station. Transmission conducted by Beaufort NAN

[16] Direction finding station. Control and transmission conducted by Cape May NSD

[17] Trans-oceanic receiving station

[18] Trans-oceanic station communicates with Hawaiian Islands

[19] Direction finding station. Control and transmission by Boston NAD

[20] For correspondence exchanged with the steam ferries "Hermosa" and "Cabrillo"

[21] The station transmits time signals and a daily weather report and forecast, relating to the Pacific coast, prepared by the

Cape Cod [10]	Massachusetts 42° 02′ 58″ N. 70° 04′ 32″ W.	NAE	—	U.S. Navy	800	D F [19]	—	—	—
Cape Fear [6]	North Carolina	NDK	—	U.S. Navy	800	D F [6]	—	—	—
Cape Hatteras [4]	North Carolina 35° 15′ 58″ N. 75° 31′ 21″ W.	NDW	200	U.S. Navy	300, 600	P G	N	0.30	—
Cape Hatteras [11]	North Carolina 35° 14′ 22″ N. 75° 31′ 42″ W.	NDW	—	U.S. Navy	800	D F [11]	—	—	—
Cape Henlopen [6]	Delaware 38° 47′ 26″ N. 75° 05′ 16″ W.	NSD	—	U.S. Navy	800	D F [6]	—	—	—
Cape Henry [14]	Virginia 36° 55′ 16″ N. 75° 59′ 51″ W.	NCZ	—	U.S. Navy	800	D F [14]	—	—	—
Cape Lookout [15]	North Carolina	NAN	—	U.S. Navy	800	D F [15]	—	—	—
Cape Lookout Shoals Light Vessel (No. 80)	North Carolina 34° 18′ 00″ N. 74° 24′ 00″ W.	NABV	—	U.S. Navy	600	P G	N	—	—
Cape May [4]	New Jersey 38° 55′ 50″ N. 74° 55′ 46″ W.	NSD	150	U.S. Navy	300, 600	P G	N	0.30	—
Cape May [16]	New Jersey 38° 56′ 41″ N. 74° 53′ 10″ W.	NSD	—	U.S. Navy	800	D F [16]	—	—	—
Carney's Point	New Jersey 39° 43′ 00″ N. 75° 27′ 00″ W.	WPO	100	E. I. du Pont de Nemours & Co.	300, 425, 600	— [31]	X	—	—
Charleston, South Carolina [4]	32° 51′ 38″ N. 79° 57′ 42″ W.	NAO	200	U.S. Navy	300, 600	P G [29]	N	0.30	—
Charleston Light Vessel (No. 34)	—	NAZJ	—	U.S. Navy	600	P G	N	—	—
Chatham WSO	Massachusetts 41° 40′ 00″ N. 69° 51′ 00″ W.	WSO	—	Marconi Co. of America	—	— [17]	—	—	—
Chatham NXA [8]	—	NXA	—	U.S. Navy	300, 600	P G [8]	N	0.30	—
Chicago [4]	Illinois 41° 52′ 30″ N. 87° 37′ 30″ W.	NUR	150	U.S. Navy	300, 600	P G	N	0.30	—
Cleveland, Ohio [4]	41° 29′ 59″ N. 81° 41′ 13″ W.	NRH	150	U.S. Navy	300, 600	P G	N	0.30	—
Columbia River Light Vessel (No. 88)	Oregon 46° 11′ 00″ N. 124° 11′ 00″ W.	NAJT	—	U.S. Navy	600	P G	N	—	—
Conneaut Harbour	Lake Erie 41° 57′ 00″ N. 80° 36′ 00″ W.	WEV	220	Marquette Besemer Dock and Navigation Co.	300, 475, 540, 600	P R [28]	X	0.15	—
Cornfield Point Light Vessel (No. 48)	New York 41° 13′ 00″ N. 72° 23′ 00″ W.	NASC	—	U.S. Navy	600	P G	N	—	—
Craftonville	California 34° 05′ 10″ N. 117° 02′ 30″ W.	KJQ	250	Southern California Edison Co.	1,610	— [31]	X	—	—

United States Weather Bureau at San Francisco. (For full particulars see International Time and Weather Signals)

[22] Direction finding station. Control and transmission conducted by New York (NAH)

[23] Operated by the United States Signal Corps War Dept., Washington D.C.

[24] Coast Artillery School

[25] Great Lakes training station

[26] The station sends time signals daily at 1055 to 1100 (time of the Meridian 90° W. of Greenwich) on a wave-length of 1,512 metres. (For full particulars, see International Time and Weather Signals)

[27] The station communicates only with Oakland (California)

[28] The station is limited to correspondence with Scranton (Pennsylvania), Binghamton, Buffalo (New York State), and with the trains of the Delaware Lackawanna and Western Railroad Co. It is used in connection with that company's business

[29] The station communicates only with Pittsburg (Kansas) and Wichita (Kansas)

[30] Direction finding station. Transmission done by Key West (NAR)

[31] This station only exchanges correspondence of private interest with other fixed stations

[32] The station also communicates with Phœnix (Arizona)

[33] Meantime of the Meridian 120° W. of Greenwich

[34] For radiotelegrams

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Cross Rip Light Vessel (No. 20)	Massachusetts	NAQB	—	U.S. Navy ..	600	P G ..	N	—	—	
Cross Island [5] ..	Maine 44° 36′ 22″ N. 67° 16′ 49″ W.	NFL	—	U.S. Navy ..	800	D F [5] ..	—	—	—	
Damiscove Island [5] ..	Maine 43° 45′ 17″ N. 69° 36′ 47″ W.	NFQ	—	U.S. Navy ..	800	D F [5] ..	—	—	—	
Deer Island [10] ..	Massachusetts 42° 21′ 15″ N. 70° 57′ 30″ W.	NAD	—	U.S. Navy ..	800	D F [10] ..	—	—	—	
D.L. & W.R.R. Limited Train	—	—	—	Delaware, Lackawanna & Western Railroad Co.	—	—	—	—	—	
Denver, Colorado ..	39° 45′ 00″ N. 105° 00′ 00″ W.	KIX	100	William H. Smith	300, **575**	— [31]	X	—	—	
Detroit, Michigan NRQ	42° 15′ 00″ N. 83° 07′ 00″ W.	NRQ	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Detroit, Michigan WOK	42° 20′ 00″ N. 83° 10′ 00″ W.	WOK	300	Goodyear Tire and Rubber Co.	300, **600**, 2,160	— [31]	0830 to 1630 [50]	—	—	
Diamond Shoals Light Vessel (No. 72)	Off Cape Hatteras 35° 05′ 08″ N. 75° 18′ 38″ W.	NITQ	—	U.S. Navy ..	600	P G ..	N	—	—	
Douglas, Arizona ..	31° 20′ 41″ N. 109° 22′ 24″ W.	KDC	100	The Copper Queen Consolidated Mining Co.	**600**, 1,650	P ..	1000 to 1100 [42] 1600 to 1700	—	—	
Dry Tortugas, Florida	—	NYZ	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Duluth, Minnesota ..	46° 47′ 06″ N. 92° 07′ 10″ W.	NUX	150	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
East San Pedro, California [4]	33° 44′ 00″ N. 118° 17′ 00″ W.	NPX	350	U.S. Navy ..	300, **600**	P G ..	N	0.10 [30] 0.30	—	
Ecorse, Michigan ..	—	NDL	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Eureka, California [4] ..	Table Bluff 40° 41′ 44″ N. 124° 16′ 22″ W.	NPW	200	U.S. Navy ..	300, **600**	P G [3, 31] ..	N	0.30	—	
Farallons [4]	California 37° 41′ 58″ N. 123° 00′ 04″ W.	NPI	100	U.S. Navy ..	300, **600**	P G [3, 31] ..	N	0.30	—	

Remarks:

exchanged with ships in the North and South American service

[35] For radiotelegrams exchanged with ships in the trans-oceanic service

[36] The station also communicates with Frankfort, Michigan

[37] The station also exchanges correspondence with Nassau (Bahamas)

[38] The station also communicates with Fort Morgan (Alabama) NHB

[39] The station is limited to correspondence with Canton (Ohio)

[40] Direction finding station. Transmission conducted by Siasconsett (NBS)

[41] The station sends time signals daily, commencing at 1155 (time of the meridian 75° W. of Greenwich) on a wave-length of 1,000 metres. (For full particulars see International Time and Weather Signals)

[42] Mean time of the meridian 75° W. of Greenwich

[43] The station sends a time signal daily, Sundays and holidays excepted, at 1155 (time of the meridian 120° W. of Greenwich) on a wave-length of

Fenwick Island Shoal Light Vessel (No. 52)	Delaware 38° 26′ 00″ N. 74° 46′ 00″ W.	NAJS	—	U.S. Navy ..	600	P G ..	N	—	—
Fire Island NAG [8] ..	New York	NAG	—	U.S. Navy ..	300, 600	P G [8] ..	N	0.30	—
Fire Island NAH [33] ..	New York 40° 38′ 07″ N. 73° 12′ 32″ W.	NAH	—	U.S. Navy ..	800	D F [33] ..	—	—	—
Fire Island Light Vessel (No. 68)	New York 40° 28′ 00″ N. 73° 11′ 00″ W.	NLS	—	U.S. Navy ..	600	P G ..	N	—	—
Fisherman's Island [8]	Virginia	NBF	—	U.S. Navy ..	300, 600	P G [8] ..	N	0.30	—
Five Fathom Bank Light Vessel (No. 79)	New Jersey 38° 47′ 00″ N. 74° 34′ 00″ W.	NADV	—	U.S. Navy ..	600	P G ..	N	—	—
Fort Adams [33] ..	Rhode Island	WUU	125	U.S. Army ..	1,100, 1,200	O ..	X	—	—
Fort Andrews [33] ..	Massachusetts	WUA	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Barrancas [33] ..	Florida	WZD	125	U.S. Army ..	1,100	O ..	X	—	—
Fort Bliss [33]	Texas	WZO	1,000	U.S. Army ..	1,300	O ..	X	—	—
Fort Casey [33] ..	Washington	WZJ	—	U.S. Army ..	825	O ..	X	—	—
Fort Constitution [33] ..	New Hampshire	WZE	—	U.S. Army ..	825	O ..	X	—	—
Fort Crockett [33] ..	Texas	WUX	—	U.S. Army ..	825	O ..	X	—	—
Fort Dade	Florida	WZK	—	U.S. Army ..	825	O ..	X	—	—
Fort Dupont [33] ..	Delaware	WZN	—	U.S. Army ..	825	O ..	X	—	—
Fort Hancock, New Jersey [33]	—	WUB	—	U.S. Army ..	500, 1,100, 1,200	O ..	X	—	—
Fort H. G. Wright [33]	New York	WUC	—	U.S. Army ..	1,100	O ..	—	—	—
Fort Howard [33] ..	Maryland	WZB	50	U.S. Army ..	825	O ..	X	—	—
Fort Leavenworth [33]	Kansas 39° 21′ 00″ N. 94° 55′ 31″ W.	WUD	—	U.S. Army ..	1,800	O ..	X	—	—
Fort Levitt [33] ..	Maine	WUF	—	U.S. Army ..	1,100	O ..	X	—	—
Fort McIntosh [33] ..	Texas	WUH	—	U.S. Army ..	2,000	O ..	X	—	—
Fort Monroe WUF [33]	Virginia	WUF	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Monroe WUG [34]	Virginia	WUG	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Morgan, Alabama NHB [4]	30° 13′ 42″ N. 88° 01′ 23″ W.	NHB	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Fort Morgan, Alabama WUR [33]	—	WUR	—	U.S. Army ..	825	O ..	X	—	—
Fort Moultrie [33] ..	South Carolina	WZF	—	U.S. Army ..	825	O ..	X	—	—
Fort Rosecrans [33] ..	California	WUS	—	U.S. Army ..	1,100	O ..	X	—	—
Fort St. Philip [33] ..	Louisiana	WXQ	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Sam Houston [33]	Texas 29° 27′ 04″ N. 98° 27′ 31″ W.	WUJ	1,000	U.S. Army ..	2,000	O ..	X	—	—
Fort San Jacinto [33] ..	Texas	WUY	—	U.S. Army ..	825	O ..	X	—	—
Fort Screvens [33] ..	Georgia	WZA	—	U.S. Army ..	825	O ..	X	—	—
Fort Stevens [33] ..	Washington	WUK	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Terry, New York [33]	—	WUW	—	U.S. Army ..	1,100, 1,300	O ..	X	—	—
Fort Totten [33] ..	New York	WUL	—	U.S. Army ..	1,100, 1,200	O ..	X	—	—
Fort Travis [33] ..	Texas	WXP	—	U.S. Army ..	825	O ..	X	—	—
Fort Washington ..	Maryland	WYX	—	U.S. Army ..	825, 1,200	O ..	X	—	—
Fort Whitman [33] ..	Washington	WZC	—	U.S. Army ..	825	O ..	X	—	—
Fort Winfield Scott [33]	California	WUO	—	U.S. Army ..	1,100	O ..	X	—	—
Fort Wood [33] ..	New York	WUM	—	U.S. Army ..	1,100	O ..	X	—	—

2,400 metres. (For full particulars see International Time and Weather Signals)

[44] The station is limited to communication with vessels entering or leaving the port of Portland, or bound to or from Columbia River points

[45] Direction finding station. Transmission conducted by Newport (NAF)

[46] The station is limited to correspondence with stations of the Southern California Edison Co.

[47] Direction finding station. Transmission conducted by St. Augustine (NAP)

[48] The station communicates only with Binghamton and with stations on moving trains between Hoboken (New Jersey) and Buffalo (New York State)

[49] This station also communicates with Koko Head NPM

[50] Mean time of the meridian 105° W. of Greenwich

[51] The station transmits weather reports daily at 0800 (time of the meridian 75° W. of Greenwich)

[52] The station sends a time signal daily at 1155 and 2155 (time of the meridian 75° W. of Greenwich), on a wave-length of 2,500 metres. (For full particulars see International Time and Weather Signals)

[53] The station will signal daily weather reports and forecasts, relating to the North Atlantic ocean immediately after the time signals at 10 p.m. (For full particulars see International Time and Weather Signals)

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.
	Meridian of Greenwich.							Francs.	Francs.
UNITED STATES OF AMERICA—*contd.*									
Fort Worden [23] ..	Washington	WUN	—	U.S. Army ..	1,100	O ..	X	—	—
Fourth Cliff [19] ..	Massachusetts 42° 09′ 40″ N. 70° 42′ 22″ W.	NAD	—	U.S. Navy ..	800	D F [19] ..	—	—	—
Frankfort, Michigan [4]	44° 37′ 46″ N. 86° 14′ 17″ W.	NSR	150	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Frying Pan Shoals Light Vessel (No. 94) [4]	North Carolina, off Cape Fear 33° 33′ 30″ N. 77° 48′ 20″ W.	NLC	60	U.S. Navy ..	600	P G [8] ..	N	—	—
Galveston [4]	Texas 29° 18′ 54″ N. 94° 46′ 52″ W.	NKB	200	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Gloucester, Massachusetts [19]	42° 35′ 19″ N. 70° 41′ 08″ W.	NAD	—	U.S. Navy ..	800	D F [19] ..	—	—	—
Grand Haven [4] ..	Michigan 43° 03′ 17″ N. 86° 14′ 51″ W.	NSY	100	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Great Lakes [4 25] ..	Illinois 42° 18′ 30″ N. 87° 50′ 00″ W.	NAJ	800	U.S. Navy ..	300, **600**	P G [25] ..	N	0.30	—
Great Round Shoals Light Vessel (No. 66)	Rhode Island 41° 24′ 00″ N. 69° 55′ 00″ W.	NABJ	—	U.S. Navy ..	600	P G ..	N	—	—
Hampton Roads [8] ..	Virginia	NAM	—	U.S. Navy ..	300, **600**	P G [8] ..	N	0.30	—
Handkerchief Light Vessel (No. 3)	Massachusetts 41° 29′ 00″ N. 70° 04′ 00″ W.	NAQS	—	U.S. Navy ..	600	P G ..	N	—	—
Heald Bank Light Vessel (No. 81)	Texas 29° 06′ 00″ N. 94° 13′ 00″ W.	NLP	—	U.S. Navy ..	600	P G ..	N	—	—
Hedge Fence Light Vessel (No. 9)	Massachusetts	NATD	—	U.S. Navy ..	600	P G ..	N	—	—
Hen and Chickens Light Vessel No. 42)	Massachusetts	NAPP	—	U.S. Navy ..	600	P G ..	N	—	—
Hillcrest, Daly City [4]	California 37° 47′ 00″ N. 122° 14′ 00″ W.	NWO	200	U.S. Navy ..	300, **600**	P G ..	N	0.30	—
Hog Island [14] ..	Virginia 37° 22′ 36″ N. 75° 42′ 37″ W.	NCZ	—	U.S. Navy ..	800	D F [14] ..	—	—	—

Remarks.

- [54] The station only exchanges correspondence of private interest with the stations of the International Milling Co.
- [55] The station only communicates with Pittsburg (Kansas) and Independence (Kansas)
- [56] The station is limited to correspondence with Denver (Colorado)
- [57] Signal Corps Laboratory (experimental)
- [58] Bureau of Standards (experimental)
- [59] Mean time of the meridian 90° W. of Greenwich
- [60] The station communicates only with Scranton (Pennsylvania) and with stations on moving trains between Hoboken (New Jersey) and Buffalo (New York State)
- [61] The station is limited to correspondence with Mount Vernon, Ohio
- [62] The station is restricted to communication with the vessels Marquette and Bessemer No. 1, and Marquette and Bessemer No. 2
- [63] The station only communicates with the owner's yacht
- [64] Direction finding station. Transmission done by Charleston NAO

Hoboken, New Jersey	40° 43′ 00″ N. 74° 02′ 00″ W.	WBU	400	Marconi Co. of America	2,240	—[29]	X	—	—
Hollister, California . .	36° 55′ 43″ N. 121° 24′ 00″ W.	KGH	200	Palmer B. Hewlett	300, **600**, 1,650	—[27]	X	—	—
Independence, Kansas	37° 14′ 00″ N. 95° 44′ 00″ W.	WQL	150	Kansas Gas and Electric Co.	1,700	P[33] . .	X	—	—
Indian Head, Maryland[4]	38° 38′ 00″ N. 77° 10′ 55″ W.	NBG	—	U.S. Navy . .	300, **600**	P G . .	N	0·30	—
Inglewood, California	34° 03′ 00″ N. 118° 15′ 00″ W.	NWR	—	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Jacksonville, Florida[4]	Mouth of St. John's River 30° 19′ 25″ N. 81° 38′ 56″ W.	NFI	200	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Jupiter[4]	Florida 26° 56′ 52″ N. 80° 04′ 55″ W.	NAQ	200	U.S. Navy . .	300, **600**	P G[3] . .	N	0.30	—
Keyport, Washington	—	NPZ	—	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Key West, Florida[4]	24° 33′ 28″ N. 81° 48′ 26″ W.	NAR	400	U.S. Navy . .	300, **600**	P G[67] . .	N	0.30	—
Key West[30] . .	Florida	NAR	—	U.S. Navy . .	800	D F[30] . .	—	—	—
Lents	Oregon 45° 23′ 00″ N. 122° 35′ 00″ W.	KFU	—	Federal Telegraph Co.	—	—	—	—	—
Lewistown, Montana	—	KLP	150	Montana Power Co.	300, 600, **1,600**	—[31]	X	—	—
Los Angeles, California	34° 04′ 00″ N. 118° 15′ 00″ W.	KLS	1,000	Federal Telegraph Co.	300, **600**, 1,800, 2,800, 3,250	P G[32] . .	0400 to 2200[33]	0.30[34] 0.60[35]	—
Ludington, Michigan[4]	43° 56′ 47″ N. 86° 26′ 19″ W.	NTM	125	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Mackinac Island[4] . .	Michigan 45° 50′ 00″ N. 84° 37′ 00″ W.	NUD	150	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Manistique[4] . .	Michigan 45° 57′ 36″ N. 86° 15′ 36″ W.	NUB	125	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Manitowoc[4] . .	Wisconsin 44° 05′ 18″ N. 87° 39′ 17″ W.	NTY	125	U.S. Navy . .	300, **600**	P G[36] . .	N	0.30	—
Mare Island	California 38° 06′ 00″ N. 122° 16′ 00″ W.	NPG	—	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Marion	Massachusetts 41° 42′ 00″ N. 70° 50′ 00″ W.	NMM	—	Marconi Co. of America	—	—[68]	—	—	—
Marshfield, Oregon[4]	43° 22′ 26″ N. 124° 12′ 50″ W.	NPF	150	U.S. Navy . .	300, **600**	P G . .	N	0.30	—
Martins Industry Light Vessel (No. 1)	South Carolina 32° 06′ 00″ N. 80° 28′ 00″ W.	NART	—	U.S. Navy . .	600	P G . .	N	—	—
Miami, Florida[3, 4] . .	South-east Coast of Florida 25° 48′ 21″ N. 80° 07′ 15″ W.	NGE	300	U.S. Navy . .	300, **600**	P G[37] . .	N	0.30	—
Milwaukee, Wisconsin[4]	43° 02′ 50″ N. 87° 55′ 25″ W.	NUK	150	U.S. Navy . .	300, **600**	P G . .	N	0.30	—

[65] Under construction

[66] Trans-oceanic transmitting station

[67] A time signal is transmitted daily. (See International Time and Weather Signals)

[68] Trans-Atlantic service. Receiving station for New Brunswick, NFF

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
	Meridian of Greenwich.							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*										
Mobile, Alabama [6] ..	30° 41′ 34″ N. 88° 02′ 27″ W.	NGT	200	U.S. Navy ..	300, **600**	P G [38] ..	N	0.30	—	
Montauk Point [38] ..	Long Island, New York 41° 03′ 09″ N. 71° 57′ 27″ W.	NAH	—	U.S. Navy ..	800	D F [38] ..	—	—	—	
Montoloking [38] ..	New Jersey 40° 01′ 30″ N. 74° 03′ 10″ W.	NAH	—	U.S. Navy ..	800	D F [38] ..	—	—	—	
Morris Island, South Carolina [64]	32° 41′ 33″ N. 79° 53′ 15″ W.	NAO	—	U.S. Navy ..	800	D F [64] ..	—	—	—	
Mount Vernon, Ohio	40° 24′ 00″ N. 82° 31′ 00″ W.	WQV	80–90	Bunyan J. Hyatt	500	—[39]	X	—	—	
Nantucket (Surfside) [40]	41° 14′ 42″ N. 70° 05′ 56″ W.	NBS	—	U.S. Navy ..	800	D F [40] ..	—	—	—	
Nantucket Shoals Light Vessel (No. 85)	Rhode Island 40° 37′ 00″ N. 69° 36′ 00″ W.	NLA	—	U.S. Navy ..	600	P G ..	N	—	—	
New Brunswick ..	New Jersey 40° 31′ 00″ N. 74° 29′ 00″ W.	NFF	—	Marconi Co. of America	—	—[66]	—	—	—	
New London, Connecticut	41° 22′ 40″ N. 72° 05′ 40″ W.	NRZ	100	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
New Orleans NAT ..	Louisiana 29° 56′ 50″ N. 90° 02′ 18″ W.	NAT	100	U.S. Navy ..	300, **600**	P G [3] [41]	N	0.30	—	
New Orleans NJK ..	Louisiana 30° 00′ 20″ N. 90° 06′ 20″ W.	NJK	400	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Newport, Rhode Island	41° 29′ 17″ N. 71° 19′ 44″ W.	NAF	200	U.S. Navy ..	300, **600**	P G [3] [6] ..	N	0.30	—	
New Prague ..	Minnesota 44° 32′ 39″ N. 93° 31′ 12″ W.	WPU	300	New Prague Flouring Mill Co.	500	—[51]	X	—	—	
New York City ..	—	NAH	—	U.S. Navy ..	300, **600**	P G [3] [3] ..	N	0.30	—	
New York Herald ..	40° 42′ 02″ N. 74° 00′ 50″ W.	NAH	—	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Norfolk, Virginia [6] ..	36° 49′ 39″ N. 76° 17′ 41″ W.	NAM	200	U.S. Navy ..	300, **600**	P G [3] [6] ..	N	0.30	—	

North East End LightVessel (No. 44)	New Jersey 38° 57′ 00″ N. 74° 29′ 00″ W.	NARS	—	U.S. Navy ..	600	P G ..	N	—	—
North Head [4] ..	Washington 46° 17′ 42″ N. 124° 04′ 34″ W.	NPE	400	U.S. Navy ..	300, 600	P G [3, 21, 43]	N	0.30	—
North Island [5] ..	South Carolina 33° 13′ 18″ N. 79° 11′ 04″ W.	NZW	—	U.S. Navy ..	800	D F [5] ..	—	—	—
Oakland, California..	37° 48′ 41″ N. 122° 16′ 14″ W.	KGI	150	Ellery W. Stone..	300, 500, 600	P ..	X	—	—
Overfalls Light Vessel (No. 69)	Delaware 38° 48′ 00″ N. 75° 01′ 00″ W.	NAKT	—	U.S. Navy ..	600	P G ..	N	—	—
Pensacola, Florida [3, 4]	Gulf of Mexico 30° 20′ 54″ N. 87° 16′ 13″ W.	NAS	100	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Philadelphia ..	Pennsylvania 39° 53′ 18″ N. 75° 10′ 46″ W.	NAI	150	U.S. Navy ..	300, 600	P G [3] ..	N	0.30	—
Phœnix, Arizona ..	33° 26′ 30″ N. 112° 05′ 30″ W.	KHQ	300	Federal Telegraph Co.	3,000, 3,400	— [21]	Local Time. 0600 to 1800	—	—
Point Arguello [4] ..	California 34° 34′ 35″ N. 120° 38′ 48″ W.	NPK	100	U.S. Navy ..	300, 600	P G [3, 21, 43]	N	0.30	—
Point Huenceme [45] ..	34° 12′ 00″ N. 119° 12′ 00″ W.	—	—	U.S. Navy ..	—	—	—	—	—
Point Isabel [4] ..	Texas 26° 05′ 00″ N. 97° 12′ 00″ W.	NAY	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Pollock Rip Light Vessel (No. 47)	Massachusetts 41° 32′ 00″ N. 69° 54′ 00″ W.	NANS	—	U.S. Navy ..	600	P G ..	N	—	—
Pollock Rip Slue Light Vessel (No. 73)	Massachusetts 41° 36′ 00″ N. 69° 53′ 00″ W.	NAFT	—	U.S. Navy ..	600	P G ..	N	—	—
Port Arthur, Texas [4]	29° 52′ 46″ N. 93° 55′ 35″ W.	NJY	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Portland, Maine ..	43° 33′ 42″ N. 70° 12′ 03″ W.	NAB	100	U.S. Navy ..	300, 600	P G [3] ..	N	0.30	—
Portland Light Vessel (No. 74)	Maine 43° 32′ 00″ N. 70° 02′ 00″ W.	NAMS	—	U.S. Navy ..	600	P G ..	N	—	—
Portland, Oregon KDP	45° 30′ 45″ N. 122° 42′ 30″ W.	KDP	150	Charles L. Austin	200, 300, 425, 550, 600	— [44]	X	—	—
Portland, Oregon KGN	45° 32′ 00″ N. 122° 41′ 00″ W.	KGN	150	North-Western Electric Co.	300, 600, 1,700	— [21]	X	—	—
Port Royal, South Carolina [4]	32° 22′ 00″ N. 80° 41′ 00″ W.	NAV	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Portsmouth, New Hampshire [4]	43° 04′ 33″ N. 70° 44′ 00″ W.	NAC	150	U.S. Navy ..	300, 600	P G [3] ..	N	0.30	—
Prices Neck, Rhode Island [46]	41° 27′ 06″ N. 71° 20′ 15″ W.	NAF	—	U.S. Navy ..	800	D F [46] ..	—	—	—
Providence, Rhode Island	41° 49′ 00″ N. 71° 25′ 00″ W.	WPF	100	Dutee W. Flint ..	300, 450, 600	P [22] ..	X	—	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal.	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Puget Sound [4] ..	Washington 47° 33′ 47″ N. 122° 38′ 19″ W.	NPC	200	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
Ram Island Reef Light Vessel (No. 23)	Connecticut 41° 18′ 00″ N. 71° 58′ 00″ W.	NARX	—	U.S. Navy ..	600	P G ..	N	—	—	
Relief Light Vessel No. 4	Second District, Boston	NAZV	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 16	Third District, New York	NASK	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 49	Sixth District, Baltimore	NESC	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 53	Sixth District, South Carolina	NAJC	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 86	Second District, Boston	NAJJ	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 78	Third District, New York	NITP	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 90	Second District, Boston	NITQ	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Relief Light Vessel No. 92	Thirteenth District, Pacific	NADB	—	U.S. Navy ..	300, **600**, 952	P G ..	N	—	—	
Rialto, California ..	34° 12′ 08″ N. 117° 26′ 53″ W.	KJR	250	Southern California Edison Co.	300, **600**, 1,610	P R [46] ..	X	—	—	
Rockaway Beach [3, 23]	New York 40° 33′ 52″ N. 73° 52′ 40″ W.	NAH	—	U.S. Navy ..	800	D F [23] ..	—	—	—	
St. Augustine, Florida [4]	North-east coast of Florida 29° 53′ 20″ N. 81° 17′ 05″ W.	NAP	100	U.S. Navy ..	300, **600**	P G ..	N	0.30	—	
St. Augustine, Florida [47]	—	NAP	—	U.S. Navy ..	800	D F [47] ..	—	—	—	
San Diego, California [4]	32° 42′ 26″ N. 117° 15′ 00″ W.	NPL	200	U.S. Navy ..	300, **600**	P G [3, 21, 48]	N	0.30	—	
Sandy Hook [23] ..	New Jersey 40° 28′ 12″ N. 74° 01′ 06″ W.	NAH	—	U.S. Navy ..	800	D F ..	—	—	—	
San Francisco ..	37° 48′ 30″ N. 122° 22′ 02″ W.	NPG	—	U.S. Navy ..	300, **600**	P G [47] ..	N	0.30	—	

San Francisco Beach	California	NWO	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
San Francisco, Crocker Building	California	NWO	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—
San Francisco Light Vessel (No. 70)	California	NAKS	—	U.S. Navy ..	600	P G ..	N	—	—
Savannah[4]	Georgia 32° 05′ 15″ N. 81° 06′ 15″ W.	NEV	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Sayville	New York, Long Island	NDD	—	U.S. Navy ..	—	—[48]	—	—	—
Scotland Light Vessel (No. 11)	New York 40° 26′ 00″ N. 73° 55′ 00″ W.	NARV	—	U.S. Navy ..	600	P G ..	N	—	—
Scranton, Pennsylvania	41° 24′ 00″ N. 75° 42′ 00″ W.	WTP	—	Delaware, Lackawanna and Western Railroad Co.	—	—[48]	—	—	—
Sea Gate[4]	New York 40° 34′ 23″ N. 74° 00′ 12″ W.	NAH	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Seattle NVL[4] ..	Washington 47° 36′ 00″ N. 122° 20′ 00″ W.	NVL	150	U.S. Navy ..	300, 600	P G[49] ..	N	0.30	—
Seattle KPE ..	Washington 47° 37′ 00″ N. 122° 20′ 00″ W.	KPE	100	City of Seattle, Harbour Dept.	300, 575, 600	P G ..	0800 to 1200 · 1300 to 1700 except Sundays and holidays	0.30	—
Siasconsett[4] ..	Massachusetts, Nantucket Island 41° 15′ 50″ N. 69° 58′ 19″ W.	NBS	165	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Smith Island[14] ..	Virginia 37° 07′ 08″ N. 75° 53′ 42″ W.	NCZ	—	U.S. Navy ..	800	D F[14] ..	—	—	—
South Pass Light Vessel (No. 102)	Louisiana 28° 53′ 00″ N. 89° 26′ 00″ W.	NAGT	—	U.S. Navy ..	600	P G ..	N	—	—
South San Francisco	California 37° 44′ 40″ N. 122° 24′ 20″ W.	NPG	2,500	U.S. Navy ..	—	—[18]	—	—	—
Stone Horse Shoal Light Vessel (No. 5)	Massachusetts 41° 32′ 00″ N. 69° 59′ 00″ W.	NANT	—	U.S. Navy ..	600	P G ..	N	—	—
Swiftsure Bank Light Vessel (No. 93)	Washington 48° 31′ 00″ N. 125° 00′ 00″ W.	NABT	—	U.S. Navy ..	600	P G ..	N	—	—
Tail of Horse Shoe Light Vessel (No. 46)	Virginia	NAZR	—	U.S. Navy ..	600	P G ..	N	—	—
Tampa, Florida[4] ..	27° 56′ 54″ N. 82° 25′ 36″ W.	NGL	200	U.S. Navy ..	300, 600	P G ..	N	0.30	—
Tatoosh[4]	Washington, off Cape Flattery 48° 23′ 30″ N. 124° 44′ 06″ W.	NPD	100	U.S. Navy ..	300, 600	P G[3] ..	N	0.30	—

Land Stations—*Continued*

Name.	Geographical Position.	Call Signal	Normal Range in Nautical Miles.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
UNITED STATES OF AMERICA—*contd.*	Meridian of Greenwich.							Francs.	Francs.	
Tuckerton, New Jersey [4]	39° 34′ 45″ N. 74° 20′ 00″ W.	NWW	—	U.S. Navy ..	—	—[66]	—	—	—	
Umatilla Reef Light Vessel (No. 67)	Washington 48° 09′ 00″ N. 124° 51′ 00″ W.	NACV	—	U.S. Navy ..	600	P G ..	N	—	—	
Underwood, Washington	45° 45′ 00″ N. 121° 32′ 00″ W.	KGO	75	North-Western Electric Co.	300, **600**, 1,700	—	X	—	—	
University of Florida	—	NUGC	—	U.S. Navy ..	300, **600**	P ..	N	—	—	
Victor, Colorado ..	38° 40′ 00″ N. 105° 07′ 00″ W.	KIW	160	Ajax Gold Mining Co.	575	—	0900 to 1130 [50] 1930 to 2300	—	—	
Vineyard Sound Light Vessel (No. 41)	Massachusetts 41° 22′ 00″ N. 71° 00′ 00″ W.	NACX	—	U.S. Navy ..	600	P G ..	N	—	—	
Virginia Beach [4] ..	Virginia, entrance to Chesapeake Bay 36° 50′ 36″ N. 75° 58′ 58″ W.	NCZ	200	U.S. Navy ..	300, **600**	P G [51] ..	N	0.30	—	
Washington NAA [4]	Virginia, near Washington, D.C. 38° 52′ 05″ N. 77° 04′ 47″ W.	NAA	1,000 spk. 2,000 cw.	U.S. Navy ..	300, **600**, 2,500 spk. 6,000 cw.	O [3 5 52 53]	—	—	—	
Washington (Navy Yard) NAL [4]	District of Columbia 38° 52′ 21″ N. 77° 00′ 11″ W.	NAL	150	U.S. Navy ..	300, **600**	P G [8] ..	N	0.30	—	
Washington WUP [57]	District of Columbia	WUP	—	U.S. Army ..	—	O ..	—	—	—	
Washington WUQ [58]	District of Columbia	WUQ	—	U.S. Bureau of Standards	—	O ..	—	—	—	
Washington WWV [58]	District of Columbia	WWV	—	U.S. Bureau of Standards	—	O ..	X	—	—	
Washington NSJ [1] ..	District of Columbia	NSJ	—	U.S. Navy ..	—	O ..	X	—	—	
Watch Hill, Rhode Island [46]	41° 18′ 21″ N. 71° 51′ 29″ W.	NAF	—	U.S. Navy ..	800	D F [43] ..	—	—	—	
Wells, Minnesota ..	43° 45′ 00″ N. 93° 45′ 00″ W.	WPT	150	Wells Flour Mill Co.	500	P [54] ..	X	—	—	
Wichita, Kansas ..	37° 42′ 00″ N. 97° 20′ 00″ W.	WQM	200	Kansas Gas and Electric Co.	1,700	P [55] ..	X	—	—	

Wilmington, North Carolina	—	NWN	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—	
Wilmington, Delaware	39° 44′ 16″ N. 75° 32′ 52″ W.	WPP	300	E. I. du Pont de Nemours & Co.	300, 425, 600	—[M]	X	—	—	
Winter Quarter Shoals Light Vessel (No. 91)	Virginia 37° 55′ 00″ N. 74° 56′ 00″ W.	NADT	—	U.S. Navy ..	600	P G ..	N	—	—	
Yerba Buena ..	Goat Island, San Francisco	NPG	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—	
URUGUAY										
Banco Ingles ..	To the south-east of Montevideo 35° 06′ 30″ S. 55° 53′ 30″ W.	CWC	100	Government ..	450, 600	—	—	—	—	[1] The station transmits a weather report each day except Sunday. (See International Time and Weather Signals)
Cerrito	Near Montevideo 34° 51′ 20″ S. 56° 10′ 10″ W.	CWA	1,000	Government ..	600, 1,000, 1,250	P G[1] ..	N	0.53	5.30	
Isla de Lobos ..	35° 01′ 39″ S. 54° 53′ 01″ W.	CWB	100	Government ..	450, 600	—	—	—	—	
VIRGIN ISLANDS										
St. Croix	—	NNI	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—	
St. Thomas	18° 20′ 00″ N. 64° 53′ 00″ W.	NBB	—	U.S. Navy ..	300, 600	P G ..	N	0.30	—	
WINDWARD ISLANDS (West Indies)										
St. Lucia	13° 50′ 00″ N. 60° 59′ 00″ W.	VQH	—	Government ..	—	P G ..	—	0.60	—	
ZANZIBAR										
Pemba, Zanzibar ..	5° 14′ 00″ S. 39° 45′ 00″ E.	VQE	85	Government ..	300, 600	P G[1] ..	Local Time. 0800 to 1200 1400 to 1600	0.20	1.60	[1] The station also exchanges official and public correspondence with Zanzibar
Zanzibar	6° 10′ 00″ S. 39° 11′ 00″ E.	VPZ	85	Government ..	300, 600	P G[2] ..	0800 to 1200 1400 to 1600	0.20	1.60	[2] The station also exchanges public and official correspondence with Pemba, Zanzibar

B. SHIP STATIONS

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
ARGENTINA							Francs.	Francs.	
Alferez Mackinlay	LNB	—	Navy	450, **600**	O	N	—	—	[1] Operated and controlled by the owner
Almirante Brown	LKA	—	Navy	450, **600**	O	N	—	—	
Argentino LMS[1]	LMS	260	Soc. Impta. y. Expta. de la Patagonia	300, **600**	P G	N	0.40	4.00	
Aristobulo del Valle	LKX	—	Government	300, 450, **600**	O	N	—	—	
Asturiano[1]	LMT	260	Soc. Impta. y Expta. de la Patagonia	300, **600**	P G	N	0.40	4.00	
Az pardo	LNF	—	Navy	300, 450, **600**	O	N	—	—	
Bahia Blanca LMK	LMK	—	Navy	300, **600**	O	N	—	—	
Belgrano LKB	LKB	—	Navy	450, **600**	O	N	—	—	
Berna[1]	LLN	135	Compañia Argentina de Nav. (Nicolás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Bruselas[1]	LLO	135	Compañia Argentina de Nav. (Nicolás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Buenos Aires LKC	LKC	—	Navy	450, **600**	O	N	—	—	
Buenos Aires LLP[1]	LLP	135	Compañia Argentina de Nav. (Nicolás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Cabo Corrientes[1]	LMO	300	A. M. Delfino y Hermano (Hamburg Sud-Am. D.S. Ges.)	300, **600**	P G	N	0.40	4.00	
Cabo S. Maria[1]	LMN	300	A. M. Delfino y Hermano (Hamburg Sud-Am. D.S. Ges.)	300, **600**	P G	N	0.40	4.00	
Camarones[1]	LME	600	A. M. Delfino y Hermano (Hamburg Sud-Am. D.S. Ges.)	300, 450, **600**	P G	N	0.40	4.00	
Catamarca	LKD	—	Navy	450, **600**	O	N	—	—	
Chaco	LKE	—	Government	450, **600**	O	N	—	—	
Chubut	LKI	—	Navy	450, **600**	O	N	—	—	
Colonia LLQ[1]	LLQ	135	Compañia Argentina de Nav. (Nicolás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Cordóba LKF	LKF	—	Navy	450, **600**	O	N	0.40	4.00	
Corrientes	LNG	—	Navy	**300**, 450	O	N	—	—	
Draga 13	LNL	55	Government (Department of Public Works)	400	O	X	—	—	
Draga 14C.	LNK	60	Government	400	O	X	—	—	
Draga 16C.	LMQ	100	Government	450	O	9 a.m. to 11 a.m. 3 to 5 p.m.	—	—	
Draga 209	LLH	—	Government	500	O	N	—	—	
Draga 210	LLI	—	Government	500	O	N	—	—	
Draga 211	LLJ	—	Government	500	O	N	—	—	

Draga 212C	LMW	216	Government	2,000	O	..	9 a.m. to 11 a.m. 3 to 5 p.m.	—	—
El Plata LKG	LKG	--	Navy	450, 600	O	..	N	—	—
Entre Rois LKH ..	LKH	—	Navy	450, 600	O	..	N	—	—
Bolo	LLR	135	Compañia Argentina de Nav. (Nicolás Mihanovich)	300, 600	P G	..	N	0.40	4.00
Formosa LMU[1] ..	LMU	50	Compañia Argentina de Nav. (Nicolás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
Fragata Sarmiento ..	LKJ	—	Navy	450, 600	O	..	N	—	—
Garibaldi LKK ..	LKK	—	Navy	450, 600	O	..	N	—	—
Gaviota LKL	LKL	—	Navy	450, 600	O	..	N	—	—
Guarany[1]	LLS	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
Guardia Nacional ..	LKM	—	Government	450, 600	O	..	N	—	—
Humaitá[1]	LMV	150	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
Independencia ..	LKN	—	Navy	450, 600	O	..	N	—	—
Ingeniero Iribas ..	LLL	—	Navy	500	O	..	N	—	—
Ingeniero Luis. A. Huergo	LKS	—	Government	300, 450, 600	O	..	N	—	—
Jujuy	LKO	—	Navy	450, 600	O	..	N	—	—
Labrador	LLU	80	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
Lambaré[1]	LLV	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
La Plata LKP ..	LKP	—	Navy	450, 600	O	..	N	—	—
Libertad	LKQ	—	Navy	450, 600	O	..	N	—	—
Lisboa	LLM	135	Nicholas Mihanovich	300, 600	P G	..	N	0.40	4.00
Londres[1]	LLW	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, 600	P G	..	N	0.40	4.00
Los Andres LKR ..	LKR	—	Navy	450, 600	O	..	N	—	—
Madrid	LLY	135	Nicholas Mihanovich	300, 600	P G	..	N	0.40	4.00
Ministro Escurra ..	LNA	—	Government	450, 600	O	..	N	—	—
Misiones	LNH	—	Navy	800, 450	O	..	N	—	—
Moreno	LKT	—	Navy	600-1,500	O	..	N	—	—
Nueve de Julio ..	LKU	—	Navy	450, 600	O	..	N	—	—
Ona	LNC	—	Government	450, 600	O	..	N	—	—
Pampa LKV	LKV	—	Government	450, 600	O	..	N	—	—
Pampero	LLK	—	Government	300	O	..	N	0.40	4.00
Paraná LKW	LKW	—	Navy	450, 600	O	..	N	—	—
Paris LLZ	LLZ	135	—	300, 600	P G	..	N	0.40	4.00
Patagonia LML ..	LML	—	Government	300, 600	O	..	N	—	—
Patria LKY	LKY	—	Navy	450, 600	O	..	N	—	—
Piedrabuena	LKZ	—	Navy	300, 450, 600	O	..	N	—	—
Presidente Mitre[1] ..	LMG	600	A. M. Delfino y Hermano (Hamburg Sud-Am. D.S. Ges.)	300, 450, 600	P G	..	N	0.40	4.00
Presidente Quintana[1] ..	LMH	600	A. M. Delfino y Hermano (Hamburg Sud-Am. D.S. Ges.)	300, 450, 600	P G	..	N	0.40	4.00
Primero de Mayo ..	LLA	—	Navy	450, 600	O	..	N	—	—
Pueyrredón	LLB	—	Navy	450, 600	O	..	N	—	—
Querandi	LND	—	Government	450, 600	O	..	N	—	—
Rio de la Plata LMI ..	LMI	150	Compañia de Nav. Santiago Lambruschini	300, 600	O	..	N	0.40	4.00
Rio Uruguay	LMJ	150	Compañia de Nav. Santiago Lambruschini	300, 600	O	..	N	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
ARGENTINA—*contd.*							Francs.	Francs.	
Rivadavia	LLC	—	Navy	600-1,500	O	N	—	—	
Rosario LLD	LLD	—	Navy	450, **600**	O	N	—	—	
San Martin LLE	LLE	—	Navy	450, **600**	O	N	—	—	
San Martin LMM [1]	LMM	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Triton LMB	LMB	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Uruguay LLF	LLF	—	Navy	450, **600**	O	N	—	—	
Venus LMC [1]	LMC	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
Vicente Fidel Lopez	LMR	80	Navy	350, 450, **600**	O	X	—	—	
Viena [1]	LMD	135	Compañia Argentina de Nav. (Nicholás Mihanovich), Ltd.	300, **600**	P G	N	0.40	4.00	
AUSTRALIAN COMMONWEALTH									
Apolda [2]	CGZ	—	Birt & Co.	—	—	—	—	—	[1] Operated and controlled by the Amalgamated Wireless (Australasia) Ltd., Sydney. [2] Operated and controlled by the owners
Aramac [1]	VJJ	—	Australian United S.N. Co.	300, **600**	P G	Limited	—	—	
Arawatta [1]	VKV	—	Australian United S.N. Co.	300, **600**	P G	Limited	—	—	
Australbrook [1]	CGN	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australbush [1]	CGC	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australcrag [1]	VZQ	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australdale [1]	CGF	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australfield	VZU	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australford [1]	CGE	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australglen [1]	CGD	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australia VKA	VKA	—	Navy	— 600	— O	—	—	—	
Australmead [1]	VZW	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australmount [1]	VZY	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australpeak [1]	VZS	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australplain [1]	CGB	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australpool [1]	VZP	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australport [1]	VZT	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australrange [1]	CGA	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Australstream [1]	CGG	—	Commonwealth Govt. Line	300, **600**	P G	Limited	—	—	
Bellata [1]	VXK	—	Commonwealth Govt. Line	—	—	—	—	—	
Bethanga [1]	VXO	—	Commonwealth Govt. Line	—	—	—	—	—	
Bingera [1]	VJD	240	Australian United S.N. Co.	300, **600**	P G	Limited	—	—	

Bombala[1]	VHF	250	Australian S.S. Ltd.	300, 600	P G ..	Limited	—	—
Brisbane VKB ..	VKB	—	Navy	600	O ..	—	—	—
Bundafra[1]	VXM	—	Commonwealth Govt. Line ..	—	—	—	—	—
Canberra[1]	VHO	250	Australian S.S., Ltd.	300, 600	P G ..	Limited	0.20	—
Cerebus	VKO	—	Government	600	O ..	—	—	—
Cethana[1]	VXC	—	Commonwealth Govt. Line ..	—	—	—	—	—
Challamba[1]	VXG	—	Commonwealth Govt. Line ..	—	—	—	—	—
Changsha[1]	CGU	240	G. S. Yuill & Co., Ltd.	300, 600	P G ..	Limited	—	—
Charon[1]	VJM	240	Ocean S.S. Co.	300, 600	P G ..	Limited	—	—
Cockburn Sound Base	VKR	—	Government	600	O ..	—	—	—
Coolcha[1]	VXJ	—	Commonwealth Govt. Line ..	—	—	—	—	—
Coolgardie[1]	VHJ	240	Wardle (James)	300, 600	P G ..	Limited	—	—
Cooma[1]	VJE	250	Australian S.S., Ltd.	300, 600	P G ..	Limited	—	—
Culburra[1]	VXF	240	Commonwealth Govt. Line ..	300, 600	P G ..	Limited	—	—
Cycle	CGS	240	Australian S.S., Ltd.	300, 600	P G ..	Limited	—	—
Derwent VKK ..	VKK	—	Navy	600	O ..	—	—	—
Dimboola[1]	VHL	240	Melbourne S.S. Co.	300, 600	P G ..	Limited	0.20	—
Echunga[1]	CGI	—	Adelaide S.S. Co., Ltd.	—	—	—	—	—
Encounter	VKE	—	Navy	600	O ..	—	—	—
Fiona[2]	VHQ	240	Colonial Sugar Ref. Co.	300, 600	P G ..	—	0.20	—
Flinders Island Base ..	VKP	—	Government	600	P G ..	—	—	—
Garden Island Base ..	VKQ	—	Government	600	O ..	—	—	—
Gorgan	VKW	—	A. Holt & Co.	—	—	—	—	—
Indarra[1]	VHP	240	Australian United S.S. Co. ..	300, 600	P G ..	Limited	0.20	—
Kanowna[1]	VHD	250	Australian United S.S. Co. ..	300, 600	P G ..	Limited	0.20	—
Karoola[1]	VHE	240	McIlwraith, McEacharn's Line, Proprietary, Ltd.	300, 600	P G ..	Limited	0.20	—
Katoomba[1]	VHN	300	McIlwraith, McEacharn's Line, Proprietary, Ltd.	300, 600	P G ..	Limited	0.20	—
Kowarra[1]	—	—	Australian S.S., Ltd.	—	—	—	—	—
Levuka[1]	VHB	250	Australian United S.S. Co. ..	300, 600	P G ..	Limited	0.20	—
Loongana[1]	VJH	200	Union S.S. Co. of New Zealand, Ltd.	300, 600	P G ..	Limited	—	—
Macedon[1]	CGX	—	Australian S.S., Ltd.	300, 600	P G ..	Limited	—	—
Makambo[1]	VZB	240	Burns, Philp & Co.	300, 600	P G ..	Limited	—	—
Marsina[1]	VKY	240	Burns, Philp & Co.	300, 600	P G ..	Limited	—	—
Melbourne VKC ..	VKC	—	Navy	600	O ..	—	—	—
Melusia[1]	CGT	240	Burns, Philp & Co.	300, 600	P G ..	Limited	—	—
Minderoo[1]	VKX	240	Western Australia S.S. Co. ..	300, 600	P G ..	Limited	—	—
Mindini[1]	VJY	240	Burns, Philp & Co.	300, 600	P G ..	Limited	—	—
Montoro[1]	VHT	240	Burns, Philp & Co.	300, 600	P G ..	Limited	0.20	—
Morialta[1]	VKZ	—	Adelaide S.S. Co., Ltd.	—	—	—	—	—
Morinda[1]	VJF	240	Burns, Philp & Co.	300, 600	P G ..	Limited	0.20	—
Navy Office	VKN	—	Government	600	O ..	—	—	—
Ooma[1]	VXN	—	William Crosby & Co., Ltd. ..	—	—	—	—	—
Paringa[1]	VZC	—	Adelaide S.S. Co.	300, 600	P G ..	Limited.	—	—
Parramatta	VKJ	—	Navy	600	O ..	—	—	—
Pioneer VKF	VKF	—	Navy	600	O ..	—	—	—
Port Stephens Base ..	VKS	—	Government	600	O ..	—	—	—
Protector	VKG	—	Navy	600	O ..	—	—	—
Riverina[1]	VJA	250	Huddart Parker, Ltd.	300, 600	P G ..	Limited.	0.20	—
Rupara[1]	VZA	—	Adelaide S.S. Co.	300, 600	P G ..	Limited	—	—
South Africa[1]	VNS	—	Cape Explosives, Ltd.	—	—	—	—	—
Suva[1]	VJI	200	Australasian United S.S. Co. ..	300, 600	P G ..	Limited	0.20	—
Swan	VKM	—	Navy	600	O ..	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.
AUSTRALIAN COMMONWEALTH—*contd.*							Francs.	Francs.
Sydney VKD	VKD	—	Navy	600	O	—	—	—
Taiyuan [1]	CGY	—	G. S. Yuill & Co.	300, **600**	P G	Limited	—	—
Torrens	VKL	—	Navy	600	O	—	—	—
Ulimaroa [1]	VHY	250	Huddart Parker, Ltd	300, **600**	P G	Limited	0.20	—
Una (ex Komet—German)	—	—	—	—	—	—	—	—
Victoria [1]	VHX	250	Huddart Parker, Ltd.	300, **600**	P G	Limited	0.20	—
Wandilla [1]	VHI	240	Adelaide S.S. Co.	300, **600**	P G	Limited	0.20	—
Warra VKI	VKI	—	Navy	600	O	—	—	—
Westralia [1]	VJB	250	Huddart Parker, Ltd.	300, **600**	P G	Limited	0.20	—
Winfield	CGR	—	Adelaide S.S. Co.	300, **600**	P G	Limited	—	—
Wodonga [1]	VHK	—	Australasian United S.S. Co.	300, **600**	P G	Limited	—	—
Wyandra [1]	VHW	240	Australasian United S.S. Co.	300, **600**	P G	Limited	0.20	—
Wyreema [1]	VJG	200	Australasian United S.S. Co.	300, **600**	P G	Limited	0.20	—
Yankalilla	VZN	—	Adelaide S.S. Co.	300, **600**	P G	Limited	—	—
Yarra	VKI	—	Navy	600	O	—	—	—
Zealandia [1]	VJC	240	Huddart Parker, Ltd.	300, **600**	P G	Limited	0.20	—
BELGIUM								
Albertville [1]	OTV	200	Cie. Maritime du Congo	300, 450, **600**	P G	N	0.40	4.00
Algerier [1]	ONQ	—	Lloyd Royal Belge	—	—	—	—	—
Anvers [1]	—	—	Soc. d'Armement Adolf Deppe	—	P G	N	0.40	4.00
Anversoise [1]	OOA	100-150	S.A. Anversoise de Navigation	300, **600**	P G	N	0.40	4.00
Anversville [1]	ONV	200	Cie. Maritime du Congo	300, 450, **600**	P G	N	0.40	4.00
Armistice [1]	ONM	—	Cie. d'Armement Adolf Deppe	—	—	—	—	—
Australier [1]	ONU	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00
Asturienne [1]	OPU	—	Req. by French Government	300, **600**	P G	X	0.40	4.00
Belgier [1]	OOB	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00
Caledonier [1]	ONC	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00
Comte de Flandre [1]	OOF	100-150	Ocean S.H. Belge d'Armement et de Navig.	300, **600**	P G	N	0.40	4.00
Delos	OOD	—	—	—	—	—	—	—
Eglantier [1]	OOE	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00
Emanuel Nobel [1]	OOL	100-150	S.A. d'Armement d'Industrie et de Commerce	300, **600**	P G	X	0.40	4.00
Erivan [1]	OTE	—	S.A. d'Armement d'Industrie et de Commerce	—	P G	N	0.40	4.00

Notes.

[1] Operated by the Soc. Anonyme Internationale de Télégraphie Sans fils, Brussels.

[2] Ship engaged in Cross-Channel service between Dover and Belgium. Messages exchanged either between the steamers and Antwerp or Ostend coast stations, or between two of the steamers on this service, no special ship charge is applied. The charge per message is 3 frs. per radiotelegram of 10 words or less, with 20 centimes for each additional word.

Escaut [3]	OSE	250	Soc. d'Armement Adolf Deppe ..	300, 600	P G ..	N	—	—
Gallacier [1]	ORC	—	Lloyd Royal Belge (Antwerp) ..	—	P G ..	N	0.40	4.00
Gallier [1]	ONG	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Gantoise [1]	OOG	100-150	S. A. Anversoise de Navigation ..	300, 600	P G ..	N	0.40	4.00
General Degoutte [1] ..	OTR	150-200	Soc. Maritime Belge de Gand ..	300, 600	P G ..	N	0.40	4.00
Gothland [1]	ORG	—	Red Star Line (Antwerp)	—	P G ..	N	0.40	4.00
Grand Remorquer ..	OSR	30-50	Government	500, 600	O ..	X	—	—
Indier [1]	ONI	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Italier [1]	OOI	100-150	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Jan Breydel	ONJ	60	Government	300	P R ..	—	—	—
Kasbek [1]	OOK	—	S.A. d'Armement d'Industrie et de Commerce	—	P G ..	N	0.40	4.00
Kelter [1]	OOQ	—	Lloyd Royal Belge (Antwerp) ..	—	P G ..	N	0.40	4.00
Kremlin [1]	ORK	—	S.A. d'Armement d'Industrie et de Commerce	—	P G ..	N	0.40	4.00
Lapland [1]	ORL	150-200	Red Star Line (Antwerp) ..	300, 450, 600	P G ..	N	0.40	4.00
Leopold II.	OPD	60	Government	300	P R ..	—	—[3]	—[3]
Le Rapide	OPR	60	Government	300	P R ..	—	—[3]	—[3]
Londonier [1]	ONO	180	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Memling [1]	ORE	—	Soc. Belge d'Armement Maritime	—	—	—	—	—
Menapier [1]	OPM	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Nervier [1]	OPN	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Nipponier [1]	ONN	—	Lloyd Royal Belge (Antwerp) ..	—	P G ..	N	0.40	4.00
Northland [1]	ORZ	—	Red Star Line (Antwerp)	—	P G ..	N	0.40	4.00
Oural [1]	ORU	—	S.A. d'Armement d'Industrie et de Commerce	—	P G ..	N	0.40	4.00
Patagonier [1]	ONP	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Pionier [1]	ORP	—	Lloyd Royal Belge (Antwerp) ..	—	—	—	—	—
Persier [1]	OPS	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Pieter de Coninck ..	OPK	60	Government	300	P R ..	—	—[3]	—[3]
Princess Clémentine [1]	OOP	60	Ocean S. A. Belge d'Armement et de Navig.	300	P G ..	N	—	—
Princesse Clémentine ..	OPC	—	Government	300	P R ..	—	—[3]	—[3]
Princesse Elizabeth ..	OPE	60	Government	300	P R ..	—	—[3]	—[3]
Princesse Henriette ..	OPH	60	Government	300	P R ..	—	—[3]	—[3]
Republica Argentina [1]	OPG	—	Soc. d'Armement Adolf Deppe ..	—	P G ..	N	0.40	4.00
Rogier [1]	ONR	150-200	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Roi Albert [1]	ORA	—	Soc. d'Armement Adolf Deppe ..	—	P G ..	N	0.40	4.00
Roumanier [1]	ORR	100-150	Lloyd Royal Belge, Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Samland [1]	ORS	—	Red Star Line (Antwerp)	—	P G ..	N	0.40	4.00
Serbier [1]	OOS	100-150	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Sicilier [1]	ONS	100-150	Lloyd Royal Belge (Antwerp) ..	300, 600	P G ..	N	0.40	4.00
Sierra Blanca [1]	OSB	—	S.A. Transoceanique de Transports Paris	—	P G ..	N	0.40	4.00
Sierra de Fuentes [1] ..	OSF	200	S.A. Transoceanique de Transports Paris	300, 600	P G ..	N	0.40	4.00
Sierra de Madre [1] ..	OSD	200	S.A. Transoceanique de Transports Paris	300, 600	P G ..	N	0.40	4.00
Sierra Grande [1] ..	OSG	—	S.A. Transoceanique de Transports Paris	—	P G ..	N	0.40	4.00
Sierra Leone [1]	OSO	—	S.A. Transoceanique de Transports Paris	—	P G ..	N	0.40	4.00
Sierra Morena [1] ..	OSM	200	S.A. Transoceanique de Transports Paris	300, 600	P G ..	N	0.40	4.00
Sierra Negra [1]	OSN	—	S.A. Transoceanique de Transports Paris	—	P G ..	N	0.40	4.00

Messages exchanged with North Foreland station, the ship charge is 10 centimes per word, minimum 1 fr.

[3] Operated and controlled by the owners.

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
BELGIUM—*contd.*							Francs.	Francs.	
Sierra Roja[1]	OSJ	—	S.A. Transoceanique de Transports Paris	—	P G	N	0.40	4.00	
Sierra Quemada[1]	OSQ	—	S.A. Transoceanique de Transports Paris	—	P G	N	0.40	4.00	
Stad Antwerpen	OPA	60	Government	300	P R	—	—	—	
Tongrier[1]	OOT	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00	
Trevier[1]	OPT	150-200	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00	
Tunisie[1]	OTI	—	Armement Adolf Deppe	—	P G	N	0.40	4.00	
Tunisier	OOZ	—	Lloyd Royal Belge	—	—	—	—	—	
Ubier[1]	OOU	100-150	Lloyd Royal Belge (Antwerp)	300, **600**	P G	N	0.40	4.00	
Ville de Liege	OPL	60	Government	300	P R	—	—	—	
BRAZIL									
Acre[1]	SRF	250	Lloyd Brazileiro	300, **600**	P G	X	0.40	—	
Alagoas	SNA	60	Navy	300	O	—	0.40	—	
Alegrete[1]	STX	100	Lage & Bros.	300, **600**	P G	N	0.40	—	
Alfenas[1]	SSS	150	Lage & Bros.	300, **600**	P G	N	0.40	—	
Almirante Jaceguay[1]	SRX	190	Lloyd Brazileiro	300, **600**	P G	N	0.40	—	
Amazonas	SOA	—	Navy	300	O	—	0.40	—	
Anna[1]	PUA	150	Empreza Hoepcke	300, **600**	P G	X	0.40	—	
Antonina[1]	PVL	—	Lloyd Nacional	—	—	—	—	—	
Aracaju[1]	STY	60	Lage & Bros.	300, **600**	P G	N	0.40	—	
Asia[1]	PVG	150	Lloyd Nacional	300, **600**	P G	N	0.40	—	
Atalaia[1]	SSL	100	Lage & Bros.	300, **600**	P G	N	0.40	—	
Avaré[2]	SSJ	400	Lloyd Brazileiro	600	P G	N	0.40	—	
Aymoré[1]	SRJ	150	Lloyd Brazileiro	300, **600**	P G	X	0.40	—	
Ayruoca[1]	SSG	60	Lage & Bros.	300, **600**	P G	N	0.40	—	
Baependy[1]	SSX	60	Lage & Bros.	300, **600**	P G	N	0.40	—	
Bagé[1]	SSU	150	Lage & Bros.	300, **600**	P G	N	0.40	—	
Bahia SNB	SNB	150	Navy	**600**	O	—	0.40	—	
Bahia SRE[1]	SRE	250	Lloyd Brazileiro	300, **600**	P G	X	0.40	—	
Barbacena[1]	PUD	100	Lage & Bros.	300, **600**	P G	N	0.40	—	
Barroso	SOB	150	Navy	**600**	O	—	0.40	—	
Belem[1]	PVA	150	Lloyd Nacional	300, **600**	P G	N	0.40	—	
Benevente[2]	STQ	—	Lloyd Brazileiro	—	—	—	—	—	
Benjamin Constant	SOC	150	Navy	**600**	O	—	0.40	—	
Brazil SRM[1]	SRM	150	Lloyd Brazileiro	300, **600**	P G	X	0.40	—	

[1] Operated and controlled by the Marconi International Marine Communication Co., Ltd., Rio de Janeiro, Brazil

[2] Owned, operated and controlled by the Lloyd Brazileiro, Brazil.

Brazileira[1]	PUV	150	Couto & Cia	300, 600	P G	X	0.40	—
Cabedello[1]	PUK	100	Lage & Bros.	300, 600	P G	N	0.40	—
Campeiro[1]	PVB	150	Lloyd Nacional	300, 600	P G	N	0.40	—
Campinas[1]	PVD	90	Lloyd Nacional	300, 600	P G	N	0.40	—
Campos[2]	STR	200	Lloyd Brazileiro	600	P G	N	0.40	—
Cannavieiras[1]	PUO	150	Navegacao Bahiana	300, 600	P G	N	0.40	—
Carlos Gomes	SOR	80	Government	300	O	—	0.40	—
Caxambu[1]	SSW	100	Lage & Bros.	300, 600	P G	N	0.40	—
Caxias[2]	SST	400	Lloyd Brazileiro	600	P G	N	0.40	—
Ceara SRD[1]	SRD	250	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Ceara SNC	SNC	—	Navy	—	O	—	0.40	—
Commandante Belham[1]	SSB	75	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Commandatuba[1]	PUQ	150	Navegacao Bahiana	300, 600	P G	X	0.40	—
Curityba[1]	PUF	150	Lage & Bros.	300, 600	P G	N	0.40	—
Curvello[2]	SSH	400	Lloyd Brazileiro	600	P G	N	0.40	—
Cuyaba[2]	SSN	400	Lloyd Brazileiro	600	P G	N	0.40	—
Deodoro	SND	150	Navy	600	O	—	0.40	—
Europa PVF[1]	PVF	150	Lloyd Nacional	300, 600	P G	N	0.40	—
Floriano	SNF	150	Navy	600	O	—	0.40	—
Florianopolis[1]	SRZ	150	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Goyaz[1]	SSC	150	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Guanabara[1]	PVH	—	Lloyd Nacional	—	—	—	—	—
Guararapes[1]	PUT	—	Navegacao Bahiana	—	—	—	—	—
Guaratuba[1]	PUE	150	Lage & Bros.	300, 600	P G	N	0.40	—
Iguassú[1]	STS	100	Lage & Bros.	300, 600	P G	N	0.40	—
Ilheous[1]	PUN	150	Navegacao Bahiana	300, 600	P G	X	0.40	—
Inga[1]	SSK	60	Lage & Bros.	300, 600	P G	N	0.40	—
Iris SRU[1]	SRU	156	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Itabera[1]	STK	250	Cia N. Navegacao Costeira	300, 600	P G	6 a.m. to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—
Itagiba[1]	STF	250	Cia N. Navegacao Costeira	300, 600	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—
Itaipava[1]	PPY	—	Cia N. Navegacao Costeira	—	—	—	—	—
Itaituba[1]	PPZ	—	Cia N. Navegacao Costeira	—	—	—	—	—
Itajuba[1]	STG	240	Cia N. Navegacao Costeira	300, 600	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—
Itamaracá[1]	STL	120	Cia N. Navegacao Costeira	300, 600	P G	6 to 8 a.m. 10 a.m. midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—
Itapacy[1]	PPV	—	Cia N. Navegacao Costeira	—	—	—	—	—
Itapema[1]	STH	240	Cia N. Navegacao Costeira	300, 600	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
BRAZIL—*contd.*							Francs.	Francs.	
Itaperuna[1]	PPX	—	Cia N. Navegacao Costeira	—	—	—	—	—	
Itapuca[1]	STI	240	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itapuhy[1]	STD	250	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itapura[1]	STA	250	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itaquera[1]	STE	250	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itassuce[1]	STC	—	Cia N. Navegacao Costeira	—	—	—	—	—	
Itatinga[1]	STB	250	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itauba[1]	STJ	240	Cia N. Navegacao Costeira	300, **600**	P G	6 to 8 a.m. 10 a.m. to midday 2 to 4 p.m. 6 to 8 p.m.	0.40	—	
Itu[1]	SSF	150	Lage & Bros.	300, **600**	P G	N	0.40	—	
Jaboatao[1]	SSI	150	Lage & Bros.	300, **600**	P G	N	0.40	—	
Jaguarão	SOJ	30	Navy	100	O	—	0.40	—	
Javary[1]	SRY	150	Lloyd Brazileiro	300, **600**	P G	X	0.40	—	
Jequetinhonha[1]	PUP	150	Navegacao Bahiana	300, **600**	P G	X	0.40	—	
Joazeiro[1]	PUH	100	Lage & Bros.	300, **600**	P G	N	0.40	—	
Jose Bonifacio	SNJ	—	Navy	—	O	—	0.40	—	

Lages[1]	PUI	100	Lage & Bros.	300, 600	P G	N	0.40	—
Laguna[1]	SRI	150	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Laurindo Pitta	SNL	50	Government	300	O	—	0.40	—
Leopoldina[1]	SSV	250	Lage & Bros.	300, 600	P G	N	0.40	—
Macapa[2]	PUJ	150	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Manaos[1]	SRS	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Mandû[1]	STZ	150	Lage & Bros.	300, 600	P G	N	0.40	—
Marahu[1]	PUR	150	Navegacao Bahiana	300, 600	P G	X	0.40	—
Maranguape[2]	PUM	400	Lloyd Brazileiro	600	P G	N	0.40	—
Maranhao[1]	SRK	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Marne[1]	PVI	250	Lloyd Nacional	300, 600	P G	X	0.40	—
Matto Grosso	SOG	60	Navy	300	O	—	0.40	—
Mercedes SRO[1]	SRO	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Minas Geraes SNM	SNM	450	Navy	600	O	—	0.40	—
Minas Geraes SRB[1]	SRB	250	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Neuquen[1]	PVE	120	Lloyd Nacional	300, 600	P G	N	0.40	—
Olinda[1]	SRL	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Oyapock[1]	SRP	190	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Pacifico[1]	PUX	—	Costa & Ribeiro	—	—	—	—	—
Palmares[2]	PUL	—	Lloyd Brazileiro	—	—	—	—	—
Para SNE	SNE	60	Navy	300	O	—	0.40	—
Para SRQ[1]	SRQ	240	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Parahyba	SOP	60	Navy	300	O	—	0.40	—
Parana SNH	SNH	60	Navy	300	O	—	0.40	—
Parnahyba[1]	STP	60	Lage & Bros.	300, 600	P G	N	0.40	—
Pelotas[1]	STV	100	Lage & Bros.	300, 600	P G	N	0.40	—
Piauhy	SOY	60	Navy	300	O	—	0.40	—
Piave[1]	PVJ	250	Lloyd Nacional	300, 600	P G	X	0.40	—
Poconé[2]	SSP	200	Lloyd Brazileiro	600	P G	N	0.40	—
Porto Seguro[1]	PUS	150	Navegacao Bahiana	300, 600	P G	X	0.40	—
Purus[2]	SSE	200	Lloyd Brazileiro	600	P G	N	0.40	—
Republica SOU	SOU	60	Navy	300	O	—	0.40	—
Rio Amazonas[1]	PVK	250	Lloyd Nacional	300, 600	P G	N	0.40	—
Rio de Janeiro SRA[1]	SRA	250	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Rio Grande do Norte	SNS	60	Navy	300	O	—	0.40	—
Rio Grande do Sul	SOR	150	Navy	600	O	—	0.40	—
Ruy Barboza[1]	SRT	190	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Sabara[1]	STT	60	Lage & Bros.	300, 600	P G	N	0.40	—
Santa Catherina	SNK	60	Navy	300	O	—	0.40	—
Santarem[1]	PUC	100	Lage & Bros.	300, 600	P G	N	0.40	—
Santos SSY[2]	SSY	150	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Sao Paulo SNP	SNP	450	Navy	600, 1,200	O	—	0.40	—
Sao Paulo SRC[1]	SRC	250	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Sargento Albuquerque	SOK	50	Government	300	O	—	0.40	—
Satellite[1]	SRG	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Sergipe SNO	SNO	60	Navy	300	O	—	0.40	—
Sergipe SRH[1]	SRH	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Servulo Dourado[1]	SRR	190	Lloyd Brazileiro	300, 600	P G	N	0.40	—
Sirio[1]	SRW	150	Lloyd Brazileiro	300, 600	P G	X	0.40	—
Sobral[1]	SSR	150	Lage & Bros.	300, 600	P G	N	0.40	—
Sousmarin F.1	SOW	25	Navy	150	O	—	0.40	—
Sousmarin F.3	SOX	25	Navy	150	O	—	0.40	—
Sousmarin F.5	SOZ	25	Navy	150	O	—	0.40	—
Tabatinga[2]	PUB	—	Lloyd Brazileiro	—	—	—	—	—
Tapajoz[1]	PPA	—	Lloyd Brazileiro	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
BRAZIL—*contd.*									
Taubaté [1]	SHO	100	Lage & Bros.	300, **600**	P G	N	0.40	—	
Theresina [2]	STM	200	Lloyd Brazileiro	**600**	P G	N	0.40	—	
Tiradentes	SOT	50	Navy	300	O	—	0.40	—	
Uberaba [2]	SSZ	400	Lloyd Brazileiro	**600**	P G	N	0.40	—	
Victoria STW [1]	STW	100	Lloyd Nacional	300, **600**	P G	X	0.40	—	
Wenceslau Braz [1]	SSA	125	Lloyd Brazileiro	300, **600**	P G	N	0.40	—	
BRITISH WEST INDIES									
Parisian	VRI	—	F. Leyland, Ltd.	—	—	—	—	—	
CANADA AND NEWFOUNDLAND									
A. E. McKinstry [1]	CJE	—	Canada S.S. Lines, Ltd.	—	—	—	—	—	
Aberdeen [2]	VDG	100	Government	300	O	X	—	—	
Acadia [2]	VDT	200	Government	300, **600**	O	X	—	—	
Alberta VFQ [1]	VFQ	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—	
Aranmore VDQ [2]	VDQ	200	Government	300, **600**	O	X	—	—	
Assiniboia [1]	VGI	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—	
Athabasca [1]	VGG	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—	
Baleine [1]	VBX	—	Leonard Fisheries, Ltd.	—	—	—	—	—	
Bessie Dollar [1]	VFO	200	Dollar S.S. Lines, Ltd.	300, **600**	P G	N	—	—	
Camosun	VFZ	200	Union S.S. Co., of B.C., Ltd.	300, **600**	P G	N	0.40	—	
Canada VDC [3]	VDC	150	Government	300, **600**	O	X	—	—	
Canadian Adventurer	XWD	—	Canadian Government	—	—	—	—	—	
Canadian Miller [1]	XVZ	—	Canadian Government Merchant Marine	—	—	—	—	—	
Canadian Pioneer [1]	CKT	—	Canadian National Railways	—	—	—	—	—	
Canadian Ranger [1]	XVF	—	Canadian National Railways	—	—	—	—	—	
Canadian Recruit [1]	XVK	—	Canadian National Railways	—	—	—	—	—	
Canadian Sailor [1]	XVR	—	Canadian National Railways	—	—	—	—	—	
Canadian Signaller [1]	XVS	—	Canadian National Railways	—	—	—	—	—	
Canadian Trader [1]	XVP	—	Canadian National Railways	—	—	—	—	—	
Canadian Volunteer [1]	XVM	—	Canadian National Railways	—	—	—	—	—	
Canadian Voyageur [1]	CKS	—	Canadian National Railways	—	—	—	—	—	
Canadian Warrior [1]	XVA	—	Canadian National Railways	—	—	—	—	—	

Notes (Canada and Newfoundland):

[1] Operated and controlled by the Marconi Wireless Telegraph Co. of Canada, Ltd., Montreal

[2] Operated and controlled by the Department of Marine, Ottawa.

[3] Operated and controlled by the Department of the Naval Service, Ottawa.

Canora [1]	CKD	—	Canadian National Railways ..	—	—	—	—	—
Cayuga [1]	VEL	100	Canada S.S. Lines, Ltd.	300, 600	P G ..	N	0.40	—
Charlton [1]	VEX	—	Victoria Harbour Lumber Co. ..	—	—	—	—	—
Charybdis [1]	BPE	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Chelohsin [1]	VGN	200	Union S.S. Co. of B.C., Ltd. ..	300, 600	P G ..	N	0.40	—
Chippewa [1]	VEH	100	Canada S.S. Lines, Ltd.	300, 600	P G ..	N	0.40	—
Collingwood [1]	CKP	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Corona [1]	VEB	100	Canada S.S. Lines, Ltd.	300, 600	P G ..	N	0.40	—
Dalhousie City [1] ..	VEA	100	Canadian National Railways ..	300, 600	P G ..	N	0.40	—
Diana [1]	VOQ	—	James Baird, Ltd...	—	—	—	—	—
Dollard [2]	VDO	150	Government	300	O ..	X	—	—
Druid VDH [2]	VDH	100	Government	300, 600	O ..	X	—	—
Eagle VOU [1]	VOU	150	Bowring Bros.	300, 600	P G ..	X	0.40	—
E. B. Osler [1]	CKE	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Emperor [1]	CKF	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Empire [1] (Barge) ..	VFP	200	Can. Towing & Wrecking Co., Ltd.	300, 600	P G ..	N	0.40	—
Empress of Asia [1] ..	CJI	250	Canadian Pacific Railway Co. ..	300, 600	P G ..	X	0.40	—
Empress of Japan [1] ..	CJG	250	Canadian Pacific Railway Co. ..	300, 600	P G ..	X	0.40	—
Empress of Russia [1] ..	CJH	250	Canadian Pacific Railway Co. ..	300, 600	P G ..	X	0.40	—
Eskasoni [1]	XHC	—	Gaston Williams & Wigmore ..	—	—	—	—	—
Estevan [2]	VDN	200	Government	300, 600	O ..	X	—	—
Fogota [1]	VYQ	—	Crosbie & Co.	—	—	—	—	—
Eronterac [1]	XVY	—	C. A. Barnard	—	—	—	—	—
Galiano [2]	VDV	200	Government	300, 600	O ..	X	—	—
Glenfinnan [1]	VBL	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
Glenisle [1]	CKB	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
Glenlyon [1]	VBJ	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
Glenmavis [1]	CJL	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
Glenorchy [1]	XVB	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
Glenshee [1]	VEW	—	Great Lakes Transpt. Co., Ltd. ..	—	—	—	—	—
G. R. Crowe [1]	VET	—	Montezuma Transpr. Co., Ltd. ..	—	—	—	—	—
Guiana [1]	CJJ	200	Canada S.S. Lines, Ltd.	—	—	—	—	—
Hamonic [1]	VGD	200	Northern Navig. Co.	300, 600	P G ..	N	0.40	—
Harold Dollar [1] ..	VCY	—	Dollar S.S. Lines	—	—	—	—	—
Hazel Dollar [1]	VEE	—	Dollar S.S. Lines	—	—	—	—	—
Hochelaga [1]	CHR	—	Dominion Iron and Steel Co. ..	—	—	—	—	—
Huronic [1]	VGE	200	Northern Navig. Co.	300, 600	P G ..	N	0.40	—
Icolite [1]	VBS	—	Imperial Oil Co., Ltd.	—	—	—	—	—
Imperoyal [1]	VGM	—	Imperial Oil Co., Ltd.	—	—	—	—	—
Impoco [1]	CJN	—	Imperial Oil Co., Ltd.	—	—	—	—	—
J. H. G. Haggarty [1] ..	CKG	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Keewatin [1]	VGC	200	Cana 'ian Pacific Railway Co. ..	300, 600.	P G ..	N	0.40	—
Kerry Range [1] ..	CJO	—	Stm. Navig. of Canada, Ltd. ..	—	—	—	—	—
Kingston [1]	VEC	100	Canada S.S. Lines	300, 600	P G ..	N	0.40	—
Korona [1]	CJP	200	Canada S.S. Lines	300, 600	P G ..	N	0.40	—
Lady Evelyn [2] ..	VDX	100	Government	300, 600	O ..	X	—	—
Lady Grey [2]	VDL	100	Government	300	O ..	X	—	—
Lady Laurier [2] ..	VDF	150	Government	300	O ..	N	—	—
Lady Sybil [1]	VYV	—	International Petro. Co., Ltd. ..	—	—	—	—	—
Laketon [1]	CHO	—	Matthews S.S. Co...	—	—	—	—	—
Lingan [1]	CHQ	—	Dominion Coal Co.	—	—	—	—	—
Lord Ormond [1] ..	XTI	—	Dominion Mercantile Marine Corp. Ltd.	—	—	—	—	—
Lord Dufferin [1] ..	CJQ	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Lord Strathcona [1] ..	VFX	80	Quebec Salvage & Wrecking Co...	300	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
CANADA AND NEWFOUNDLAND—*contd.*							Francs.	Francs.	
Lucknow [1]	XCD	—	Midland Transports Co.	—	—	—	—	—	
Macassa [1]	VEK	100	Canada S.S. Lines, Ltd.	300, **600**	P G	N	0.40	—	
Malaspina [2]	VDU	200	Government	300, **600**	O	X	—	—	
Manitoba [1]	VGH	200	Canadian Pacific Railway Co.	300, **600**	P G	N	0.40	—	
Manxman [1]	CJR	—	R. Lawrence Smith Co.	—	—	—	—	—	
Margaret VDW	VDW	200	Government	300, **600**	O	X	—	—	
Mariska [1]	XVL	—	Transatlantic S.S. Co., Ltd.	—	—	—	—	—	
Martian [1]	CKH	—	Canada S.S. Lines, Ltd.	—	—	—	—	—	
Maskinonge [1]	YBE	—	Dominion Coal Co., Ltd.	—	—	—	—	—	
Meigle [1]	VYT	—	Reid Nfld. Co., Ltd.	—	—	—	—	—	
Melville Dollar [1]	—	200	Dollar S.S. Co.	300, **600**	P G	N	0.40	—	
Midland King [1]	CKI	—	Canada S.S. Lines, Ltd.	—	—	—	—	—	
Midland Prince [1]	CKJ	—	Dollar S.S. Co.	—	—	—	—	—	
Mina Brea [1]	VAP	—	International Petro Co.	—	—	—	—	—	
Montcalm VDJ [2]	VDJ	150	Government	300, **600**	O	X	—	—	
Monteagle [1]	CJV	250	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—	
Montreal [1]	VCW	—	Canada S.S. Lines, Ltd.	—	—	—	—	—	
Neptune VOX [1]	VOX	150	Job Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Newington [2]	VDP	100	Government	300	O	X	—	—	
Newona	CJW	—	Fraser Brace & Clarke, Ltd.	—	—	—	—	—	
Niobe VDA [3]	VDA	—	Navy	—	O	—	—	—	
Noronic [1]	VGW	200	Northern Navig. Co.	300, **600**	P G	N	0.40	—	
Ocamo [1]	CHS	—	Newport S.S. Co., Ltd.	—	—	—	—	—	
Parima [1]	CJX	200	Quebec S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Pathfinder [1]	—	—	James Playfair	—	—	—	—	—	
Portia [1]	VON	—	Bowring Bros.	—	—	—	—	—	
Prince Albert [1]	VFL	200	Grand Trunk Rly. Coast S.S. Co.	300, **600**	P G	N	0.40	—	
Prince Arthur [1]	VGJ	200	Boston & Yarmouth S.S. Co.	300, **600**	P G	N	0.40	—	
Prince George VGK [1]	VGK	200	Boston & Yarmouth S.S. Co.	300, **600**	P G	N	0.40	—	
Prince John [1]	VFM	200	Grand Trunk Rly. Coast S.S. Co.	300, **600**	P G	N	0.40	—	
Princess Adelaide [1]	VFA	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Alice VFD [1]	VFD	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Beatrice [1]	VFC	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Charlotte [1]	VFE	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Ena [1]	VFJ	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Maquinna [1]	VGT	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Mary [1]	VFB	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess May [1]	VFH	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	
Princess Royal VFG [1]	VFG	200	Canadian Pacific Rly. Co.	300, **600**	P G	N	0.40	—	

Prospero[1]	VQM	—	Bowring Bros.	—	—	—	—	—
Province[1]	VFR	200	Can. Towing & Wrecking Co.	300, 600	P G	N	0.40	—
Quebec[1]	XVE	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Rainbow VDB[3]	VDB	—	Navy	—	O	—	—	—
Ranger[1]	VOK	—	Bowring Bros.	—	—	—	—	—
Rapids King[1]	VEG	200	Canada S.S. Co., Ltd.	300, 600	P G	N	0.10	—
Reginald[1]	VEY	—	Victoria Harbour Lumber Co.	—	—	—	—	—
Reginolite[1]	CHW	—	Imperial Oil Co., Ltd.	—	—	—	—	—
Renvoyle[1]	CJY	—	Canada S.S. Co., Ltd.	—	—	—	—	—
Riverton[1]	VBI	—	Canada S.S. Co., Ltd.	—	—	—	—	—
Rochester[1]	—	—	Canada S.S. Co., Ltd.	—	—	—	—	—
Royalite[1]	VBQ	—	Imperial Oil Co., Ltd.	—	—	—	—	—
Sable "I"[1]	XVV	—	J. A. Farquhar & Co.	—	—	—	—	—
Sagona[1]	VYD	—	Reid Nfld. Co.	—	—	—	—	—
Saguenay[1]	VBP	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Salvor[1]	VFV	200	B. C. Salvage Co.	300, 600	P G	X	—	—
Sarnolite[1]	VBR	—	Imperial Oil Co., Ltd.	—	—	—	—	—
Schoolcraft[1]	VAU	—	Manley Chew	—	—	—	—	—
Seal[1]	VGV	200	Farquhar & Co., Ltd.	300, 600	P G	N	0.40	—
Sheba[1]	—	—	Dept. of Railways & Canals	—	—	—	—	—
Syracuse[1]	VEF	200	Canada S.S. Lines, Ltd.	300, 600	P G	N	0.10	—
Talaralite[1]	CJK	—	International Petro. Co.	—	—	—	—	—
Tees[1]	VFK	200	Canadian Pacific Rly. Co.	300	P G	8 a.m. to 8 p.m.	0.40	—
Terra Nova[1]	VYB	—	Bowring Bros., Ltd.	—	—	—	—	—
Thetis[1]	VYW	—	Job Bros. & Co., Ltd.	—	—	—	—	—
Toronto VED[1]	VED	100	Canada S.S. Lines, Ltd.	300 600	P G	N	0.40	—
Turner (General)[1]	XVT	—	Dominion Shipbuilding Co., Ltd.	—	—	—	—	—
Turret Cape[1]	CHV	—	Dominion Iron & Steel Co., Ltd.	—	—	—	—	—
Turret Court[1]	CHZ	—	Dominion Iron & Steel Co., Ltd.	—	—	—	—	—
Turret Crown	XVX	—	Universal Trans. Co. Inc. of New York	—	—	—	—	—
Venture[1]	VGZ	200	Union S.S. Co., of B.C., Ltd.	300, 600	P G	N	0.40	—
Viking[1]	VYC	—	Bowring Bros.	—	—	—	—	—
War Convoy[1]	XVO	—	Convoy S.S. Co. of Halifax	—	—	—	—	—
War Hamilton[1]	XVG	—	Mount Royal S.S. Co., Ltd.	—	—	—	—	—
War Hydra[1]	XVW	—	Mount Royal S.S. Co., Ltd.	—	—	—	—	—
Watuka[1]	CKU	—	Nova Scotia Steel & Coal Co.	—	—	—	—	—
W. D. Matthews[1]	CKK	—	Canada S.S. Lines, Ltd.	—	—	—	—	—
Wethersfield[1]	CHP	—	Canadian Maritime Co., Ltd.	—	—	—	—	—
William (General)[1]	—	—	Dominion Shipbuilding Co., Ltd.	—	—	—	—	—
Yarmouth[1]	VGY	—	North American S.S. Corp., Ltd.	—	—	—	—	—
CHILI								
Aysen	CAA	250	Companía Sud-Amer. de Vapores	300, 600	P G	X	0.40	4.00
Baquedano	CBQ	—	Navy	—	O	—	—	—
Blancho	CBB	—	Navy	—	O	—	—	—
Cachapoal	CAC	250	Companía Sud-Amer. de Vapores	300, 600	P G	X	0.40	4.00
Casma	CBK	—	Government	—	O	—	—	—
Chacabuco	CBA	—	Navy	—	O	—	—	—
Cochrane CBC	CBC	—	Navy	—	O	—	—	—
Condell	CBD	—	Navy	—	O	—	—	—
Errazuriz	CBI	—	Navy	—	O	—	—	—
Esmeralda	CBE	—	Navy	—	O	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
CHILI—*contd.*									
Ex-Cochrane	CBX	—	Navy	—	O	—	—	—	
Gamero	CBG	—	Navy	—	O	—	—	—	
Huasco	CAH	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
Imperial	CAI	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
Jarpa	CBJ	—	Navy	—	O	—	—	—	
Limari	CAL	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
Lynch	CBY	—	Navy	—	O	—	—	—	
Maipo CBU	CBU	—	Government	—	O	—	—	—	
Maipo CAB	CAB	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
Mapocho	CAM	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
O'Brien CBN	CBN	—	Navy	—	O	—	—	—	
O'Higgins	CBH	—	Navy	—	O	—	—	—	
Orella	CBO	—	Navy	—	O	—	—	—	
Palena	CAP	250	Compania Sud-Amer. de Vapores	300, **600**	P G	X	0.40	4.00	
Prat	CBP	—	Navy	—	O	—	—	—	
Rancagua	CBW	—	Government	—	O	—	—	—	
Riquelme	CBR	—	Navy	—	O	—	—	—	
Serrano	CBS	—	Navy	—	O	—	—	—	
Talcahuano	CBF	—	Navy	—	O	—	—	—	
Thompson	CBT	—	Navy	—	O	—	—	—	
Tomé	CBM	—	Navy	—	O	—	—	—	
Zeuteno	CBZ	—	Navy	—	O	—	—	—	
CHINA									
Chao-Ho	XNW	—	Navy	—	O	—	—	—	
Chu-Chien	XON	—	Navy	—	O	—	—	—	
Chu-Kwan	XOG	—	Navy	—	O	—	—	—	
Chu-Tai	XOA	—	Navy	—	O	—	—	—	
Chu-Tung	XOD	—	Navy	—	O	—	—	—	
Chu-Yew	XOY	—	Navy	—	O	—	—	—	
Chu-Yu	XOU	—	Navy	—	O	—	—	—	
Fei-Ying	XPS	—	Navy	—	O	—	—	—	
Foo-An	XNL	—	Navy	—	O	—	—	—	
Hai-Chew	XSW	—	Navy	—	O	—	—	—	
Hai-Chi	XSC	—	Navy	—	O	—	—	—	
Hai-Shen	XSP	—	Navy	—	O	—	—	—	
Hai-Yung	XSY	—	Navy	—	O	—	—	—	

Kiang-Chien	XQC	—	Navy	—	O	—	—	—
Kiang-Han	XQH	—	Navy	—	O	—	—	—
Kiang-Li	XQR	—	Navy	—	O	—	—	—
Kiang-Yuen	XQU	—	Navy	—	O	—	—	—
Kien-An	XPN	—	Navy	—	O	—	—	—
Kien-Koug	XPO	—	Navy	—	O	—	—	—
Kien-Wei	XPW	—	Navy	—	O	—	—	—
King Ching	XQW	—	Navy	—	O	—	—	—
Lien-Chin	XRC	—	Navy	—	O	—	—	—
Nan-Shen	XNS	—	Navy	—	O	—	—	—
Tung-An	XNB	—	Navy	—	O	—	—	—
Tung Chi	XPF	—	Navy	—	O	—	—	—
Ying-Swei	XSF	—	Navy	—	O	—	—	—
Yu-Chang	XNO	—	Navy	—	O	—	—	—
Yung-Chion	XNG	—	Navy	—	O	—	—	—
Yung-Fung	XNF	—	Navy	—	O	—	—	—
Yung-Kien	XNY	—	Navy	—	O	—	—	—
Yung-Tsib	XNC	—	Navy	—	O	—	—	—
CUBA								
Olinda	XA	—	Compania Maritima Cubana	—	P G	—	—	—
Paloma	XB	—	Compania Maritima Cubana	—	P G	—	0.20 0.40	—
DENMARK								
Absalon	OUA	—	Navy	600	O	X	—	—
Aegir OVK	OVK	—	Navy	600	O	X	—	—
Anden April	OVA	—	Navy	600	O	X	—	—
Annam [2]	OZN	160	Det Ostasiatiske Co.	300, 600	P	X	—	—
A. P. Bernstorff [1]	OYN	150	Det Forenede Damp. A.S. Copenhagen	300, 600	P G	X	0.40	4.00
Arnold Moersk [3]	OZS	200	S.A. Dampskibsselskabel af 1912	300, 600	P	X	—	—
Asia OYR [2]	OYR	160	Det. Ostasiatiske Co. Copen.	300, 600	P G	X	—	—
Astrid [2]	OZE	150	Det Danske Petroleums-Atkies	300, 600	P G	X	—	—
Australien OZR [2]	OZR	160	Det Ostasiatiske Co.	300, 600	P	X	—	—
Bellona OWA	OWA	—	Navy	600	O	X	—	—
Beskytteren	OUM	—	Navy	600	O	X	—	—
Botnia [1]	OXU	—	—	—	—	—	—	—
Bryderen [2]	OYW	50	Det Forenede Dampskibsselskab	300, 600	P	X	—	—
C. F. Grove	OUO	100	Government	300, 600	P G	7.30 a.m. to 11.30 a.m. 1.30 p.m. to 3.30 p.m. 7.30 p.m.	—	—
Chile OZV [2]	OZV	160	Det Ostasiatiske Co.	300, 600	P	X	—	—
Dannebrog	OUD	—	Government	600	O	X	—	—
Delfinen	OVD	—	Navy	600	O	X	—	—
Diana OWB	OWB	—	Navy	600	O	X	—	—
Eleonora Moersk [3]	OYY	200	Akties. Damp. "Svendborg"	300 600	P	X	—	—
Falster	OWC	—	Navy	600	O	X	—	—
Falstria [2]	OZW	200	Det Ostasiatiske Co.	300, 600	P	X	—	—
Fenris	OWD	—	Navy	600	O	X	—	—

[1] Operated and controlled by the Soc. Anonyme International de Tel. sans fil, Brussels

[2] Operated and controlled by the owners

[3] Operated by the owner of vessel: controlled by the Soc. Anonyme Internat. de Tel. san fils

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
DENMARK—*contd.*							Francs.	Francs.	
Ficaria[1]	OYH	150	Det Foren de Dampskibsselskab	300, **600**	P G	X	0.40	4.00	
Fionia[2]	OZK	250	Det Ostasiatiske Co.	300, **600**	P	X	—	—	
Flora OWE	OWE	—	Navy	600	O	X	—	—	
Flyvefisken	OVF	—	Navy	600	O	X	—	—	
Frederik VIII[1]	OZL	200	Det Forenede Damps. A.S., Copen.	300, **600**	P G	N	0.40	4.00	
Galathea	OVG	—	Navy	600	O	X	—	—	
Gejser	OUG	—	Navy	600	O	X	—	—	
Georg Stage[3]	OZY	100	S.A. Georg Stage Minde	300, **600**	P	X	—	—	
Gronsund	OWF	—	Navy	600	O	X	—	—	
Guldborgsund	OWG	—	Navy	600	O	X	—	—	
Gullfoss[3]	OZU	200	Islands Dampskibsselskab (Eimskipafeleg Islands)	300, **600**	P	X	0.40	4.00	
Hajen	OWH	—	Navy	600	O	X	—	—	
Havfruen	OVB	—	Navy	600	O	X	—	—	
Havhesten	OWI	—	Navy	600	O	X	—	—	
Havmanden	OVE	—	Navy	600	O	X	—	—	
Havornen	OWJ	—	Navy	600	O	X	—	—	
H. C. Orsted[2]	OZX	100	Det Store Nodiske Teleg.	300, **600**	P	X	—	—	
Hejmdal	OUJ	—	Navy	600	O	X	—	—	
Hellig Olav[1]	OZB	200	Det Forenede Dampskibsselskab	300, **600**	P G	N	0.40	4.00	
Herluf Trolle	OUH	—	Navy	600	O	X	—	—	
Hjaelperen	OUQ	—	Navy	600	O	X	—	—	
Hvalrossen	OVH	—	Navy	600	O	X	—	—	
I.C. La Cour[1]	OYL	150	Det Forenede Dampskibsselskab	300, **600**	P G	X	0.40	4.00	
Ingolf	OWK	—	Navy	600	O	X	—	—	
Island[1]	OYZ	100	Det Forenede Dampskibsselskab	300, **600**	P G	X	0.40	4.00	
Islands Falk	OUI	—	Navy	600	O	X	—	—	
Jutlandia[2]	OZG	250	Det Ostasiatiske Co.	300, **600**	P	X	—	—	
Libau[2]	OYG	250	Det Ostasiatiske Co.	300, **600**	P G	X	—	—	
Lossen	OUL	—	Navy	600	O	X	—	—	
Lovenorn	OUN	100	Government	300, **600**	P G	7 a.m. to 11 a.m. 3 to 7 p.m.	—	—	
Makrelen	OWM	—	Navy	600	O	X	—	—	
Minekran V	OWO	—	Navy	600	O	X	—	—	
Minekran VI	OWP	—	Navy	600	O	X	—	—	
Najaden	OVN	—	Navy	600	O	X	—	—	
Narhvalen	OWQ	—	Navy	600	O	X	—	—	
Neptun	OVQ	—	Navy	600	O	X	—	—	

Nordhavet [2]	OYM	160	Dampskibsselskabet Norden	300, 600	P G	X	—	—
Nordkaperen	OWR	—	Navy	600	O	X	—	—
Nordlys [2]	OZZ	200	Dampskibsselskabet Norden	300, 600	P G	X	—	—
Nymfen	OVC	—	Navy	600	O	X	—	—
Olfert Fischer	OUF	—	Navy	600	O	X	—	—
Ormen	OVO	—	Navy	600	O	X	—	—
Oscar II OZC [1]	OZC	200	Det Forenede Dampskibsselskab	300, 600	P G	N	0.40	4.00
Pacific OZI [2]	OZI	250	Det Store Nordiske Telegraf.	300, 600	P	X	—	—
Panama OZQ [2]	OZQ	200	Det Ostasiatiske Co.	300, 600	P	X	—	—
Peder Skram	OUP	—	Navy	600	O	X	—	—
Peru OZA [2]	OZA	200	Det Ostasiatiske Co.	300, 600	P	X	—	—
Phœnix OZO [2]	OZO	80	Dampskibsselskabet Norden	600	P G	X	—	—
Primula [1]	OYI	150	Det Forenede Dampskibsselskab	300, 600	P G	X	0.40	4.00
Prins Christian [2]	OXG	135	State Railways of Denmark	300, 450, 600	O	—	—	—
Prinsesse Alexandrine [2]	OXH	135	State Railways of Denmark	300, 450, 600	O	—	—	—
Protector OYJ [2]	OYJ	Day 160 night 300	Em. Z. Svitzers, Bjerg., Copen.	300, 450, 600	P	X	0.40	—
Ran	OVL	—	Navy	600	O	X	—	—
Rask [2]	OYX	200	A.S. Kjobenhavns Bunk. Depot	300, 600	P	X	—	—
Rota OWS	OWS	—	Navy	600	O	X	—	—
Rota OYK [2]	OYK	150	Dampskibsselskabet Rota	300, 600	P	8 to 9 a.m. 12 a.m. to 1 p.m. 6 to 7 p.m.	0.40	—
Saltholm	OWT	—	Navy	600	O	X	—	—
Selandia [2]	OZF	250	Det Ostasiatiske Co.	300, 600	P	X	—	—
Siam [2]	OZM	160	Det Ostasiatiske Co.	300, 600	P	X	—	—
Skjold	OUS	—	Navy	600	O	X	—	—
Söbjörnen	OVJ	—	Navy	600	O	X	—	—
Söhunden	OWW	—	Navy	600	O	X	—	—
Söløven	OWX	—	Navy	600	O	X	—	—
Söridderen	OVR	—	Navy	600	O	X	—	—
Söulven	OVU	—	Navy	600	O	X	—	—
Spaekhuggeren	OVS	—	Navy	600	O	X	—	—
Springeren	OWU	—	Navy	600	O	X	—	—
Stillehavet [1]	OXV	—	—	—	—	—	—	—
Store Nordiske [2]	OZJ	250	Det Store Nordiske Telegraf	300, 600	P	X	—	—
Storen	OWV	—	Navy	600	O	X	—	—
Svaerdfisken	OVW	—	Navy	600	O	X	—	—
S. Croix [2]	OYP	200	Det Ostasiatiske Co.	300, 600	P	X	—	—
S. Thomas [2]	OYQ	200	Det Ostasiatiske Co.	300, 600	P	X	—	—
T. 7	OWL	—	Navy	600	O	X	—	—
T. 8	OWN	—	Navy	600	O	X	—	—
Thetis OVI	OVI	—	Navy	600	O	X	—	—
Thor OWY	OWY	—	Navy	600	O	X	—	—
Tongking [2]	OZP	160	Det Ostasiatiske Co.	300, 600	P	X	—	—
Triton OVP	OVP	—	Navy	600	O	X	—	—
Tumleren	OVT	—	Navy	600	O	X	—	—
United States OZD [1]	OZD	200	Det Forenede Dampskib.	300, 600	P G	N	0.40	4.00
Valkyrien OUV	OUV	—	Navy	600	O	X	—	—
Viking OZH [1]	OZH	160	Em. Z. Svitzers Bjerg-Entreprise	300, 600	P G	X	—	—
Vindhunden	OVV	—	Navy	600	O	X	—	—
EGYPT								
Mahroussa	SUA	350	Government	300, 600	P	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
FRANCE									
Abda [1]	FPB	160	Cie de Navigation Paquet	300, **600**	P G	—	0.40	—	[1] Operated and controlled by the Comp. d'Exploitation Radio-Electrique, Paris
Abd-el Kader [1]	FGK	160	Compagnie Gen. Transatlant.	300, **600**	P G	N	0.40	—	
Aden [1]	UHV	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Afrique FCR [1]	FCR	Day 270 Night 1,080	Cie des Chargeurs Reunis	300, **600**	P G	—	0.40	—	
Afrique II [1]	—	—	M. Poret, Labez & Cie	—	—	—	—	—	
Aigle [1]	—	—	M. V. Fourny	—	—	—	—	—	
Alsace [1]	FVZ	—	Sté. Gén. de Transports Mari à Vapeur	—	—	—	—	—	
Amazone FMA [1]	FMA	Day 325 Night 650	Cie de Messageries Marit...	300, **600**	P G	6 to 10 a.m. 5 to 7 p.m. 9 to 12 p.m.	0.40	—	
Amiral Aube	UCJ	350	Navy	300, **600**	P G	N	0.05	—	
Amiral Duperre [1]	FCE	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Fourichon [1]	FCF	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Ganteaume [1]	FDZ	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Jaureguiberry [1]	FCJ	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Latouche Treville [1]	FCI	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Nielly [1]	FCX	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Ponty [1]	FDP	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Amiral Rigault de Genouilly [1]	FCG	160	Cie des Chargeurs Reunis	300, **600**	P G	N	0.40	—	
Amiral Sallandrouze de Lamornaix [1]	FCL	160	Cie des Chargeurs Reunis	300, **600**	P G	—	0.40	—	
Amiral Trehouart	ULT	100	Navy	300	P G	N	0.05	—	
Amiral Troude [1]	FCT	160	Cie des Chargeurs Reunis	300, **600**	P G	—	0.40	—	
Amiral Villaret de Joy use [1]	FCV	—	Cie des Chargeurs Reunis	—	—	—	—	—	
Anatolie [1]	FPA	—	Cie de Navigation Paquet	—	—	—	—	—	
Andree [1]	HTD	—	Soc "Les Affreteurs Reunis"	—	—	—	—	—	
Andre Lebon [1]	FNG	—	Cie des Messageries Maritimes	—	—	—	—	—	
Ango [1]	FCN	160	Cie des Chargeurs Reunis	300, **600**	P G	—	0.40	—	
Angouleme [1]	—	—	Sté Maritime Auxil. de Transp.	—	—	—	—	—	
Antilles [1]	FGX	—	Comp. Gen. Transatlantique	—	—	—	—	—	
Antoinette [1]	UJJ	—	Mons. V. Fourny	—	—	—	—	—	
Apollon [1]	FIN	—	Soc. Les Affreteurs Reunis	—	—	—	—	—	

Aquitaine[1]	FAA	—	Ste. Gle. de Transp. Mar. a Vapeur	—	—	—	—	—
Arbalète	UDT	80	Navy	300	P G ..	N	0.05	—
Arc	UEA	80	Navy	300	P G ..	N	0.05	—
Ardeche[1]	FWK	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Argus	UKC	50	Navy	300	P G ..	N	0.05	—
Armand Behic[1] ..	FMB	325	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Armenie[1]	FPR	—	Cie de Navigation Paquet ..	—	—	—	—	—
Arquebuse	UDM	80	Navy	300	P G ..	N	0.05	—
Arr luze[1]	UBS	—	Soc. de Welladorid-Bilbao ..	—	—	—	—	—
Asie FCA[1]	FCA	160	Cie. des Chargeurs Reunis ..	300, 600	P G ..	—	0.40	—
Asie[1]	—	—	M. Poret, Lobez & Cie.	—	—	—	—	—
Aspirant-Herber ..	UFZ	80	Navy	300	P G ..	N	0.05	—
Aster[1]	FPT	—	Cie. de Navigation Paquet ..	—	—	—	—	—
Atlantique[1]	FMT	Day 270 Night 650	Cie. des Messageries Marit. ..	300, 600	P G ..	N	0.40	—
Atlas ULA	ULA	50	Navy	300	P G ..	N	0.05	—
Aube[1]	FGV	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Aurigny[1]	—	—	Cie des Chargeurs Reunis ..	—	—	—	—	—
Bagdad[1]	FNJ	—	Cie des Messageries Maritimes ..	—	—	—	—	—
Baliste	UDY	80	Navy	300	P G ..	N	0.05	—
Basse Terre[1]	FWZ	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Belier	UEC	80	Navy	300	P G ..	N	0.05	—
Belle Isle[1]	UGM	—	Cie des Chargeurs Reunis ..	—	—	—	—	—
Bien Hoa	UJA	150	Navy	300, 600	P G ..	N	0.05	—
Biskra[1]	FGN	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Bisson	UGK	80	Navy	300	P G ..	N	0.05	—
Bombarde	UEG	80	Navy	300	P G ..	N	0.05	—
Borda UJK	UJK	350	Navy	300, 600	P G ..	N	0.05	—
Bordeaux[1]	HUW	—	Sté Marit. Auxil. de Transp. ..	—	—	—	—	—
Bosphore[1]	FJY	—	Cie de Messageries Marit... ..	—	—	—	—	—
Bouclier	UFV	80	Navy	300	P G ..	N	0.05	—
Bougainville[1]	FCB	—	Cie des Chargeurs Reunis ..	—	—	—	—	—
Bouvines	ULB	150	Navy	300	P G ..	N	0.05	—
Brennus	UAX	350	Navy	300, 600	P G ..	N	0.05	—
Bretagne[1]	FSB	Day 270 Night 1,080	Cie de Navigation sud Atlantique	300, 600	P G .	N	0.40	—
Britannia FJG	FJG	160	Comps. de Navigation Cie Cyprien Fabre	300, 600	P G ..	N	0.40	—
Bruix	UIE	350	Navy	300, 600	P G ..	N	0.05	—
Buffle	ULD	50	Navy	300	P G ..	N	0.05	—
Californie[1]	FTK	160	Comp. Gen. Transatlantique ..	300, 600	P G ..	N	0.40	—
Campinas[1]	FCS	—	Cie. des Chargeurs Reunis ..	—	—	—	—	—
Canada FJC[1]	FJC	160	De Nav. Cie. Cyprien Fabre ..	300, 600	P G .	N	0.40	—
Cantal[1]	FJO	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Capitaine Faure[1] ..	FBN	—	Cie. de Nav. Cie. des Messageries Mar.	—	—	—	—	—
Capitaine Mehl ..	UGJ	80	Navy	300	P G ..	N	0.05	—
Carabine	UDR	80	Navy	300	P G ..	N	0.05	—
Carabinier	UFH	80	Navy	300	P G ..	N	0.05	—
Caraibe[1]	FWC	—	Comp. Gen. Transatlant.que ..	—	—	—	—	—
Caravellas[1]	FCK	—	Cie. des Chargeurs Reunis ..	—	—	—	—	—
Caravelle[1]	FTC	160	Comp. Gen. Transatlantique ..	300, 600	P G ..	N	0.40	—
Carnot	UAT	350	Navy	300, 600	P G ..	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
FRANCE—*contd.*							Francs.	Francs.	
Caroline FTO [1]	FTO	160	Comp. Gen. Transatlantique	300, **600**	P G	N	0.40	—	
Carquois	UEP	80	Navy	300, **600**	P G	N	0.05	—	
Casque	UFT	80	Navy	300	P G	N	0.05	—	
Cassard	UIK	150	Navy	300, **600**	P G	N	0.05	—	
Cassini	UHD	150	Navy	300, **600**	P G	N	0.05	—	
Catapulte	UED	80	Navy	300	P G	N	0.05	—	
Caucase [1]	FJK	—	Cie. de Nav. Cie. des Messageries Maritimes	—	—	—	—	—	
Caudan	ULE	50	Navy	300	P G	N	0.05	—	
Cavalier	UFP	80	Navy	300	P G	N	0.05	—	
Centaure	ULC	50	Navy	300	P G	N	0.05	—	
Cerbère	UHB	150	Navy	300	P G	N	0.05	—	
Ceylan [1]	FEH	160	Cie. des Chargeurs Reunis	300, **600**	P G	—	0.40	—	
Charlemagne	UAQ	350	Navy	300, **600**	P G	N	0.05	—	
Charles Martel	UAV	350	Navy	300, **600**	P G	N	0.05	—	
Charles Roux [1]	FGR	160	Comp. Gen. Transatlantique	300, **600**	P G	N	0.10	—	
Chasseur	UFG	80	Navy	300	P G	N	0.05	—	
Chicago FTI [1]	FTI	160	Comp. Gen. Transatlantique	300, **600**	P G	N	0.40	—	
Chili [1]	FMC	270	Cie des Messageries Marit.	300, **600**	P G	N	0.40	—	
Cimeterre	UGA	80	Navy	300	P G	N	0.05	—	
Circassie [1]	FPK	—	Cie. de Navigation Paquet	—	—	—	—	—	
Claymore	UEJ	80	Navy	300	P G	N	0.05	—	
Cognée	UFA	80	Navy	300	P G	N	0.05	—	
Commandant Bory	UGD	80	Navy	300	P G	N	0.05	—	
Commandant Dorise [1]	UAA	—	Cie des Messageries Maritimes	—	—	—	—	—	
Commandant Lucas	UGP	80	Navy	300	P G	N	0.05	—	
Commandant Rivière	UGE	80	Navy	300	P G	N	0.05	—	
Condé	UCK	350	Navy	300, **600**	P G	N	0.05	—	
Cordorcet	UAG	350	Navy	300, **600**	P G	N	0.05	—	
Cordillère [1]	FMR	300	Cie des Messageries Marit.	300, **600**	P G	—	0.40	—	
Corsica [1]	FRC	160	Comp. Fraissinet	300, **600**	P G	N	0.10	—	
Corte II [1]	FRT	160	Comp. Fraissinet	300, **600**	P G	—	0.10	—	
Cosmao	UIR	150	Navy	300, **600**	P G	N	0.05	—	
Courbet	UAZ	150	Navy	300, **600**	P G	N	0.05	—	
Coutelas	UES	80	Navy	300	P G	N	0.05	—	
Crimée [1]	FJX	—	Cie des Messageries Maritimes	—	—	—	—	—	
Cyclope	ULI	50	Navy	300	P G	N	0.05	—	
Danube [1]	FMF	—	Cie. des Messageries Maritimes	—	—	—	—	—	
Dard	UDX	80	Navy	300	P G	N	0.05	—	

Décidée	UIZ	200	Navy	300, 600	P G ..	N	0.05	—
Dehorter	UGH	80	Navy	300	P G ..	N	0.05	—
Démocratie	UAK	350	Navy	300, 600	P G ..	N	0.05	—
D'Entrecasteaux ..	UIG	350	Navy	300, 600	P G ..	N	0.05	—
Desaix	UCR	350	Navy	300, 600	P G ..	N	0.05	—
Descartes	UIH	150	Navy	300, 600	P G ..	N	0.05	—
D'Estrees	UIO	150	Navy	300, 600	P G ..	N	0.05	—
D'Iberville	UIS	200	Navy	300, 600	P G ..	N	0.05	—
Diderot	UAR	350	Navy	300, 600	P G ..	N	0.05	—
Divona [1]	FSD	Day 270 Night 1,080	Cie. de Nav. Sud Atlantique ..	300, 600	P G ..	N	0.40	—
Docteur Pierre Benoit	—	—	Cie des Messageries Maritimes ..	—	—	—	—	—
Doudart de Lagrée [1] ..	UKD	50	Navy	300	P G ..	N	0.05	—
Doukkala [1]	FPD	160	Cie de Navigation Paquet ..	300, 600	P G ..	—	0.40	—
Draa [1]	FPZ	—	Cie de Navigation Paquet ..	—	—	—	—	—
Drome UJE	UJE	150	Government	300, 600	P G ..	N	0.05	—
Drome [1] FWL	FWL	—	Comp. Gen. Transatlantique ..	—	—	—	—	—
Duc d'Aumale [1] ..	FGD	160	Comp. Gen. Transatlantique ..	300, 600	P G ..	N	0.40	—
Du Chayla	UIJ	150	Navy	300, 600	P G ..	N	0.05	—
Duguay Trouin ..	UJC	350	Navy	300, 600	P G ..	N	0.05	—
Dumbea [1]	FND	300	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Dunois	UIT	80	Navy	300	P G ..	N	0.05	—
Dupleix FNU [1] ..	FNU	—	Cie des Messageries Marit. ..	—	—	—	—	—
Dupleix FCD [1] ..	FCD	—	Cie des Chargeurs Reunis ..	—	—	—	—	—
Dupleix UCS	UCS	350	Navy	300, 600	P G ..	N	0.05	—
Durandal	UDA	80	Navy	300	P G ..	N	0.05	—
Edgar Quinet	UCB	350	Navy	300, 600	P G ..	N	0.05	—
Edouard Shaki [1] ..	HTH	—	Soc. "Les Affreteurs Reunis" ..	—	—	—	—	—
El Kantara [1]	FNK	300	Cie des Messageries Maritimes ..	300, 600	P G ..	—	0.40	—
Elisabeth Marie [1] ..	FHB	150	Sté. Générale d'Armement ..	300, 600	P G ..	X	0.40	—
Emma [1]	FHE	Day 160 Night 325	Vidor & Cie	300, 600	P G ..	7 to 10 a.m. 2 to 4 p.m. 7 to 11 p.m.	0.40	—
Emmanuella [1]	—	—	V. Fourny	—	—	—	—	—
Enseigne Henry ..	UFX	80	Navy	300	P G ..	N	0.05	—
Eole [1]	HWN	—	Soc. "Les Affreteurs Reunis" ..	—	—	—	—	—
Epée	UDG	80	Navy	300	P G ..	N	0.05	—
Epieu	UDW	80	Navy	300	P G ..	N	0.05	—
Equateur [1]	FME	300	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Ernest Renan	UCD	350	Navy	300, 600	P G ..	N	0.05	—
Escopette	UDJ	80	Navy	300	P G ..	N	0.05	—
Espagne FTE [1] ..	FTE	160	Comp. Gen. Transatlantique ..	300, 600	P G ..	N	0.40	—
Espagne FAE [1] ..	FAE	160	Sté. Gén. de Transports Marit. à Vapeur	300	P G ..	N	0.40	—
Estafette	ULM	50	Navy	300	P G ..	N	0.05	—
Etendard	UFD	80	Navy	300	P G ..	N	0.50	—
Europe FCU [1]	FCU	Day 270 Night 10.80	Cie des Chargeurs Reunis ..	300, 600	P G ..	—	0.40	—
Europe [1]	—	—	Mss. Poret, Lobez & Cie	—	—	—	—	—
Fanfare	UEZ	80	Navy	300	P G ..	N	0.05	—
Fanion	UFE	80	Navy	300	P G ..	N	0.05	—
Fantassin	UFO	80	Navy	300	P G ..	N	0.05	—
Fauconneau	UDC	80	Navy	300	P G ..	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
FRANCE—*contd.*							Francs.	Francs.	
Faulx	UGB	80	Navy	300	P G	N	0.05	—	
Figuig [1]	UBK	—	Comp. Gen. Transatlantique	—	—	—	—	—	
Flamberge	UDL	80	Navy	300	P G	N	0.05	—	
Flandre FGF [1]	FGF	160	Comp. Gen. Transatlantique	300, **600**	P G	—	0.40	—	
Flandre FVD [1]	FVD	—	Sté Gén. de Transports Marit. à Vapeur	—	—	—	—	—	
Fleuret	UER	80	Navy	300	P G	N	0.05	—	
Forbin	UIP	150	Navy	300, **600**	P G	N	0.05	—	
Formosa FVO [1]	FVO	270	Sté Gén. de Transports Marit. à Vapeur	300, **600**	P G	N	0.40	—	
Foudre	UIM	350	Navy	300, **600**	P G	N	0.05	—	
Fourche	UFW	80	Navy	300	P G	N	0.05	—	
France FTZ [1]	FTZ	160	Comp. Gén. Transatlantique	300, **600**	P G	N	0.40	—	
France FHF [1]	FHF	400	Cie Française de Marine et Commerce	300, **600**, 1,800	P G	X	0.40	—	
France UBA	UBA	350	Navy	300, **600**	P G	N	0.05	—	
Francis Garnier	UGI	80	Navy	300	P G	N	0.05	—	
Francisque	UEH	80	Navy	300	P G	N	0.05	—	
Friant	UIL	150	Navy	300, **600**	P G	N	0.05	—	
Fronde	UDQ	80	Navy	300,	P G	N	0.05	—	
Furieux	ULF	150	Navy	300, **600**	P G	N	0.05	—	
Gabion	UEX	80	Navy	300	P G	N	0.05	—	
Gabriella [1]	—	—	V. Fourny	—	—	—	—	—	
Garonna [1]	FSG	Day 270 Night 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—	
Garonne FWX [1]	FWX	—	Comp. Gén. Transatlantique	—	—	—	—	—	
Garonne UJH	UJH	150	Navy	300, **600**	P G	N	0.05	—	
Gascogne [1]	FSC	Day 270 Night 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—	
Georgie [1]	FWI	—	Comp. Gén. Transatlantique	—	—	—	—	—	
Gergovia	—	—	Cie Cyprien Fabre	—	—	—	—	—	
Glaive	UFI	80	Navy	300	P G	N	0.05	—	
Gloire	UCL	350	Navy	300, **600**	P G	N	0.05	—	
Goliath ULG	ULG	50	Navy	300	P G	N	0.05	—	
Gueydon	UCP	350	Navy	300, **600**	P G	N	0.05	—	
Guichen	UCV	350	Navy	300, **600**	P G	N	0.05	—	
Guyane [1]	FWY	—	Comp. Gén. Transatlantique	—	—	—	—	—	

Hache	UFB	80	Navy	300	P G	N	0.05	—
Haiti[1]	FGH	160	Comp. Gén. Transatlantique	300, 600	P G	—	0.40	—
Hallebarde	UDB	80	Navy	300	P G	N	0.05	—
Harpon	UDP	80	Navy	300	P G	N	0.05	—
Henri IV	UIA	350	Navy	300, 600	P G	N	0.05	—
Henriette[1]	FHH	Day 160 Night 325	Vidor & Cie	300, 600	P G	7 to 10 a.m. 2 to 4 p.m. 7 to 11 p.m.	0.40	—
Henry Fraissinet[1]	FRH	—	Comp. Fraissinet	—	—	—	—	—
Honduras[1]	FWU	—	Comp. Gén. Transatlantique	—	—	—	—	—
Hudson[1]	FTH	160	Comp. Gén. Transatlantique	300, 600	P G	N	0.40	—
Hussard	UFQ	80	Navy	300	P G	N	0.05	—
Iberia[1]	FRB	160	Comp. Fraissinet	300, 600	P G	N	0.40	—
Ibis	UKA	50	Navy	300	P G	N	0.05	—
Imerina[1]	FNH	—	Cie des Messageries Marit.	—	—	—	—	—
Ines[1]	—	—	V. Fourny	—	—	—	—	—
Infatigable	ULP	50	Navy	300	P G	N	0.05	—
Ionie[1]	FPO	160	Cie de Navigation Paquet	300, 600	P G	—	0.40	—
Ispahan[1]	FJI	—	Cie des Messageries Marit.	—	—	—	—	—
Italie[1]	FAI	2[illegible]0	Sté Gén. de Transports Marit. à Vapeur	300, 600	P G	N	0.40	—
Jacques Fraissinet[1]	FRJ	—	Comp. Fraissinet	—	—	—	—	—
Janissaire	UFS	80	Navy	300	P G	N	0.05	—
Jaureguiberry	UAW	350	Navy	300, 600	P G	N	0.05	—
Javeline	UDV	80	Navy	300	P G	N	0.05	—
Jean Bart	UAY	150	Navy	300, 600	P G	N	0.05	—
Jeanne[1]	FHG	Day 160 Night 325	Vidor & Cie	300, 600	P G	7 to 10 a.m. 2 to 4 p.m. 7 to 11 p.m.	0.40	—
Jeanne Blanche	ULN	50	Navy	300	P G	N	0.05	—
Jeanne D'Arc FWJ[1]	FWJ	—	Comp. Gén. Transatlantique	—	—	—	—	—
Jeanne D'Arc UCT	UCT	350	Navy	300, 600	P G	N	0.05	—
Jeannette[1]	FHJ	Day 160 Night 380	Sté Gén. d'Armement	300, 600	P G	8 to 10 a.m. 12 a.m. to 2 p.m. 8 to 10 p.m.	0.40	—
Jeannot[1]	—	—	V. Fourny	—	—	—	—	—
Jules Ferry	UCH	350	Navy	300, 600	P G	N	0.05	—
Jules Michelet	UCE	350	Navy	300, 600	P G	N	0.05	—
Jurien de la Gravière	UCX	350	Navy	300, 600	P G	N	0.05	—
Justice	UAI	350	Navy	300, 600	P G	N	0.05	—
Kersaint	UIW	200	Navy	300, 600	P G	N	0.05	—
Kouang-Si[1]	UHS	—	Cie des Messageries Marit.	—	—	—	—	—
Labrador[1]	—	—	J. Huret	—	—	—	—	—
La Fayette[1]	FGL	—	Comp. Gén. Transatlantique	—	—	—	—	—
La Hire	UIV	80	Navy	300	P G	N	0.05	—
Lamentin[1]	FWP	—	Comp. Gén. Transatlantique	—	—	—	—	—
Lansquenet	UFN	80	Navy	300	P G	N	0.05	—
La Loire[1]	FHL	260	Cie Nantaise de Nav. a Vapeur	300, 600	P G	—	0.40	—
La Lorraine[1]	FTL	160	Comp. Gén. Transatlantique	300, 600	P G	N	0.40	—
La Perouse[1]	FEP	—	Comp. Gén. Transatlantique	—	—	—	—	—
La Rochelle[1]	HWL	—	Comp. Gén. Transatlantique	—	—	—	—	—
La Slack[1]	—	—	Mess. Vidor & Cie.	—	—	—	—	—
Latouche-Treville	UIC	350	Navy	300, 600	P G	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
FRANCE—*contd.*							Francs.	Francs.	
Lavoisier	UIN	150	Navy	300, **600**	P G	N	0.05	—	
Liamone[1]	FRA	160	Comp. Fraissinet	300, **600**	P G	—	0.10	—	
Lieutenant de Missiessy[1]	UJU	—	Cie des Messageries Marit.	—	—	—	—	—	
Liger[1]	FSL	Day 270 Night 1,080	Cie de Nav. Sud-Atlantique	300, **600**	P G	N	0.40	—	
Lillois[1]	—	—	V. Fourny	—	—	—	—	—	
Limoges[1]	FEF	—	Sté Marit. Aux. de Transports	—	—	—	—	—	
Loiret	UJD	150	Navy	300, **600**	P G	N	0.05	—	
Lotus[1]	FML	270	Cie des Messageries Marit.	300, **600**	P G	—	0.40	—	
Louis Fraissinet[1]	FRR	—	Comp. Fraissinet	—	—	—	—	—	
Louqsor[1]	FNL	300	Cie des Messageries Marit.	300, **600**	P G	—	0.40	—	
Lutetia[1]	FST	—	Cie de Nav. Sud-Atlantique]	—	—	—	—	—	
Madonna[1]	FJM	160	Cie Cyprien Fabre	300, **600**	P G	N	0.40	—	
Magon	UGN	80	Navy	300	P G	N	0.05	—	
Malte[1]	FCM	160	Cie des Chargeurs Reunis	300, **600**	P G	N	0.40	—	
Mameluck	UFR	80	Navy	300	P G	N	0.05	—	
Mangini	UGO	80	Navy	300	P G	N	0.05	—	
Manouba[1]	FXB	160	Cie de Navigation Mixte	300, **600**	P G	N	0.10	—	
Mansoura[1]	FXZ	—	Cie de Navigation Mixte	—	—	—	—	—	
Marceau	ULQ	50	Navy	300, **600**	P G	N	0.05	—	
Marechal Bugeaud[1]	FGY	160	Comp. Gén. Transatlantique	300, **600**	P G	N	0.10	—	
Marie Rose[1]	FHI	Day 160 Night 325	Vidor & Cie.	300, **600**	P G	7 to 10 a.m. 2 to 4 p.m. 7 to 11 p.m.	0.40	—	
Marie Stella[1]	—	—	V. Fourny	—	—	—	—	—	
Maroc[1]	FHK	200	J. Huret	300, **600**	P G	X	0.40	—	
Marsa[1]	FXR	160	Cie de Navigation Mixte	300, **600**	P G	N	0.10	—	
Marseillaise	UCM	350	Navy	300, **600**	P G	N	0.05	—	
Martinique[1]	FTM	160	Comp. Gén. Transatlantique	300, **600**	P G	N	0.40	—	
Masséna	UAO	350	Navy	300, **600**	P G	N	0.05	—	
Massue	UFC	80	Navy	300	P G	N	0.05	—	
Mauritanie[1]	—	—	J. Huret	—	—	—	—	—	
Méhari	ULV	50	Navy	—	—	—	—	—	
Meinam[1]	FMH	—	Cie des Messageries Marit.	—	—	—	—	—	
Melbourne FNM[1]	FNM	300	Cie des Messageries Marit.	300, **600**	P G	—	0.40	—	
Mexico FTX[1]	FTX	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—	
Mingrelie[1]	FPX	—	Cie de Navigation Paquet	—	—	—	—	—	

Mirabeau	UAC	350	Navy	300, 600	P G ..	N	0.05	—
Mississippi [1]	FGI	—	Cie Gén. Transatlantique ..	—	—	—	—	—
Moise [1]	FGS	160	Cie Gén. Transatlantique ..	300, 600	P G ..	—	0.10	—
Montcalm UCO ..	UCO	350	Navy	300, 600	P G ..	N	0.05	—
Mont Cenis [1]	FVX	—	Sté. Gén. de Transports Marit a Vapeur	—	—	—	—	—
Mont Rose [1]	FVR	—	Sté. Gén. de Transports Marit. a Vapeur	—	—	—	—	—
Mont Ventoux [1] ..	FWW	—	Cie Gén. Transatlantique ..	—	—	—	—	—
Mortier	UEO	80	Navy	300	P G ..	N	0.05	—
Mossoul [1]	—	—	Cie des Messageries Marit. ..	—	—	—	—	—
Moulouya [1]	FXY	—	Cie de Navigation Mixte ..	—	—	—	—	—
Mousqueton	UDZ	80	Navy	300	P G ..	N	0.05	—
Mustapha II [1]	FXM	—	Cie de Navigation Mixte ..	—	—	—	—	—
Nantes [1]	FRX	—	Sté. Marit. Aux. de Transports ..	—	—	—	—	—
Navarre [1]	FTN	160	Cie Gén. Transatlantique ..	300, 600	P G ..	N	0.40	—
Nera [1]	FNN	325	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Niagara FTB [1] ..	FTB	160	Cie Gén. Transatlantique ..	300, 600	P G ..	N	0.40	—
Nievre [1]	FWN	—	Cie Gén. Transatlantique ..	—	—	—	—	—
Nordcaper [1]	—	—	Poret, Lobez & Cie.	—	—	—	—	—
Normand [1]	FJN	—	Cie des Messageries Marit. ..	—	—	—	—	—
Notre Dame des Dunes [1]	FHW	160	Madme. Vve. Christieans & Bourgain	300, 600	P G ..	X	0.40	—
Notre Dame de Lourdes [1]	—	—	V. Fourny	—	—	—	—	—
Numidia [1]	FRN	160	Comp. Fraissinet	300, 600	P G ..	—	0.10	—
Obusier	UEM	80	Navy	300	P G ..	N	0.05	—
Ocean [1]	—	—	Coppin	—	—	—	—	—
Oceanien [1]	FNO	320	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Oregon [1]	UCU	—	Cie Gén. Transatlantique ..	—	—	—	—	—
Orenoque [1]	FMO	—	Cie des Messageries Marit. ..	—	—	—	—	—
Oriflamme	UEV	80	Navy	300	P G ..	N	0.05	—
Orleans [1]	FLV	—	Sté. Marit. Aux. de Transports ..	—	—	—	—	—
Oudjda [1]	UKM	—	Cie Gén. Transatlantique ..	—	—	—	—	—
Ouessant [1]	FCW	160	Cie des Chargeurs Reunis ..	300, 600	P G ..	—	0.40	—
Oxus [1]	FMQ	300	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Pacifique [1]	FNW	300	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Patria FJP [1]	FJP	160	Cie Cyprien Fabre	300, 600	P G ..	N	0.40	—
Patrie	UAL	350	Navy	300, 600	P G ..	N	0.05	—
Paul Lecat [1]	FNP	400	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Pei Ho [1]	FMP	—	Cie des Messageries Marit. ..	—	—	—	—	—
Pelion [1]	FRP	—	Comp. Fraissinet	—	—	—	—	—
Perou [1]	FTP	160	Cie Gén. Transatlantique ..	300, 600	P G ..	N	0.40	—
Persepolis [1]	FNV	—	Cie des Messageries Marit. ..	—	—	—	—	—
Pertuisane	UDI	80	Navy	300	P G ..	N	0.05	—
Phrygie [1]	FPJ	160	Cie de Nav. Paquet	300, 600	P G ..	—	0.40	—
Picardie [1]	FJE	—	Soc. Montbard Aulynoye	—	—	—	—	—
Pierrier	UEN	80	Navy	300	P G ..	N	0.05	—
Pique	UDE	80	Navy	300	P G ..	N	0.05	—
Pistolet	UEB	80	Navy	300	P G ..	N	0.05	—
Plata FVL [1]	FVL	270	Sté. Gén. de Transp. Marit. à Vapeur	300, 600	P G ..	N	0.40	—
Pluton	UHA	150	Navy	300, 600	P G ..	N	0.05	—
Poignard	UFJ	80	Navy	300	P G ..	N	0.05	—
Porthos [1]	FMZ	—	Cie des Messageries Marit. ..	—	—	—	—	—
Pothuau	UIB	150	Navy	300, 600	P G ..	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
FRANCE—*contd.*							Francs.	Francs.	
Protet	UGM	80	Navy	300	P G	N	0.05	—	
Provence FAP[1]	FAP	160	Sté. Gen. de Transports Mar. à Vapeur	300	P G	N	0.40	—	
Puerto Rico[1]	FGU	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—	
Radioleine[1]	FXN	—	Cie de Navigation Mixte	—	—	—	—	—	
Rapière	UDK	80	Navy	300	P G	N	0.05	—	
Republique	UAM	350	Navy	300, **600**	P G	N	0.05	—	
Requin	ULR	150	Navy	300, **600**	P G	N	0.05	—	
Rhone UJG	UJG	150	Navy	300, **600**	P G	N	0.05	—	
Rhone FXH[1]	FXH	—	Cie de Navigation Mixte	—	—	—	—	—	
Rigel[1]	FVT	—	Sté. Gén. de Transports Marit. à Vapeur	—	—	—	—	—	
Rochambeau[1]	FTR	160	Cie Gén. Transatlantique	300, **600**	P G	N	0.40	—	
Roma FJR[1]	FJR	160	Cie Cyprien Fabre	300, **600**	P G	N	0.40	—	
Rorqual[1]	—	—	Poret, Lobez & Cie	—	—	—	—	—	
Rosemonde[1]	FHD	120	V. Fourny	300, **600**	P G	8 to 10 a.m. 2 to 4 p.m.	0.40	—	
Rosita[1]	FHY	250	V. Fourny	300, **600**	P G	8 to 10 a.m. 2 to 4 p.m.	0.40	—	
Russie[1]	—	—	Sté. Gén. de Transports Marit. à Vapeur	—	—	—	—	—	
Sabre	UEI	80	Navy	300	P G	N	0.05	—	
Sabretache	UET	80	Navy	300	P G	N	0.05	—	
Sacha[1]	FHC	160	Sté. Gén. d'Armement	300	P G	6 to 9 a.m. 4 to 7 p.m.	0.40	—	
Sagaie	UDO	80	Navy	300	P G	N	0.05	—	
Saint André[1]	FWE	—	Cie Gén. Transatlantique	—	—	—	—	—	
Saint François[1]	HQI	—	Comp. Navale de l'Oceanie	—	—	—	—	—	
Saint Jean[1]	—	—	Cie Gén. Transatlantique	—	—	—	—	—	
Saint Joseph[1]	—	—	Cie Gén. Transatlantique	—	—	—	—	—	
Saint Louis UAS	UAS	350	Navy	300, **600**	P G	N	0.05	—	
Saint Louis FTF[1]	FTF	—	Cie Gén. Transatlantique	—	—	—	—	—	
Saint Louis FZL[1]	FZL	—	Soc. Navale de l'Ouest	—	—	—	—	—	
Saint Marc[1]	FYC	—	Soc. Navale de l'Ouest	—	—	—	—	—	
Saint Paul[1]	FYD	—	Soc. Navale de l'Ouest	—	—	—	—	—	
Saint Pierre[1]	FYT	—	Soc. Navale de l'Ouest	—	—	—	—	—	
Saint Raphael[1]	FFE	—	Cie Frisch	—	—	—	—	—	
Saint Vincent[1]	FYV	—	Soc. Navale de l'Ouest	—	—	—	—	—	

Samara[1]	FSM	300	Cie de Navigation Sud-Atlantique	300, 600	P G ..		0.40	
Samson ULH	ULH	50	Navy	300	P G ..	N	0.05	—
Sape	UEW	80	Navy	300	P G ..	N	0.05	—
Sarbacane	UDS	80	Navy	300	P G ..	N	0.05	—
Savoie FTS[1]	FTS	160	Cie Gén. Transatlantique	300, 600	P G ..	N	0.40	—
Savoie UBE[1]	UBE	—	Sté. Gén. de Transports Marit. à Vapeur	—	—	—	—	—
Sentinelle	ULK	50	Navy	300	P G ..	N	0.05	—
Sidi Abdallah[1] ..	UHT	—	Sté. Gén. de Transports Marit. à Vapeur	—	—	—	—	—
Sidon[1]	—	—	Cie des Messageries Marit. ..	—	—	—	—	—
Somme UJT[1]	UJT	—	Cie Gén. Transatlantique	—	—	—	—	—
Somme FLZ[1]	FLZ	—	Vidor & Cie.	—	—	—	—	—
Souirah[1]	FPW	—	Cie de Navigation Paquet ..	—	—	—	—	—
Spahi	UFK	80	Navy	300	P G ..	N	0.05	—
Sphinx[1]	FNX	—	Cie des Messageries Marit. ..	—	—	—	—	—
Stylet	UEK	80	Navy	300	P G ..	N	0.05	—
Surcouf	UIQ	150	Navy	300, 600	P G ..	N	0.05	—
Suzanne et Marie[1] ..	—	—	Poret, Lobez & Cie	—	—	—	—	—
Sydney FNY[1] ..	FNY	300	Cie des Messageries Marit. ..	300, 600	P G ..	—	0.40	—
Tafna[1]	FXT	—	Cie de Navigation Mixte ..	—	—	—	—	—
Taillebourg	ULJ	50	Navy	300	P G ..	N	0.05	—
Taza[1]	UAH	—	Cie Gén. Transatlantique	—	—	—	—	—
Tchad[1]	FCY	—	Cie des Chargeurs Reunis	—	—	—	—	—
Texas[1]	FWS	—	Cie Gén. Transatlantique	—	—	—	—	—
Timgad[1]	FGO	160	Cie Gén. Tran atlantique ..	300	P G ..	N	0.10	—
Tirailleur	UFM	80	Navy	300	P G ..	N	0.05	—
Toulouse[1]	FHK	—	Sté. Marit. Aux. de Transports ..	—	—	—	—	—
Touraine[1]	FTT	160	Cie Gén. Transatlantique	300, 600	P G ..	N	0.40	—
Trident	UEQ	80	Navy	300	P G ..	N	0.05	—
Tromblon	UEL	80	Navy	300	P G ..	N	0.05	—
Ustaritz[1]	HOZ	—	Sté d'Importation du Nord et l'Est	—	—	—	—	—
Valdivia FVV[1] ..	FVV	270	Sté. Gén. de Transports Marit. à Vapeur	300	P G ..	N	0.40	—
Vaucluse[1]	FWV	—	Cie. Gén. Transatlantique	—	—	—	—	—
Vaucluse	ULO	80	Government	300	P G ..	N	0.05	—
Venezia FJV[1]	FJV	160	Cie Cyprien Fabre	300, 600	P G ..	N	0.40	—
Venezuela FTW[1] ..	FTW	325	Cie Gén. Transatlantique	300, 600	P G ..	N	0.40	—
Vergniaud	UAH	350	Navy	300, 600	P G ..	N	0.05	—
Vérité	UAJ	350	Navy	300, 600	P G ..	N	0.05	—
Victor Hugo	UCG	350	Navy	300, 600	P G ..	N	0. 5	—
Vigilante	UKB	50	Navy	300	P G ..	N	0.05	—
Ville de Bone[1]	FGB	160	Cie Gén. Transatlantique	300, 600	P G ..	—	0.10	—
Ville de Madrid[1] ..	FGM	160	Cie Gén. Transatlantique	300, 600	P G ..	—	0.10	—
Ville de Nantes[1] ..	FWB	—	Cie Gén. Transatlantique	—	—	—	—	—
Ville de Oran[1] ..	UBQ	—	Cie Gén. Transatlantique	—	—	—	—	—
Ville de Tunis[1] ..	FGT	—	Cie Gén. Transatlantique	—	—	—	—	—
Vinh Long	UJB	150	Government	300, 600	P G ..	N	0.05	—
Virginie[1]	FTV	160	Cie Gén. Transatlantique	300, 600	P G ..	N	0.40	—
Voltaire UAD ..	UAD	350	Navy	300, 600	P G ..	N	0.05	—
Voltigeur	UFL	80	Navy	300	P G ..	N	0.05	—
Vulcain[1]	HUA	—	Soc. " Les Affreteurs Réunis " ..	—	—	—	—	—
Waldeck-Rousseau ..	UCA	350	Navy	300, 600	P G ..	N	0.05	—
Yatagan	UDH	80	Navy	300	P G ..	N	0.05	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.
GREAT BRITAIN							Francs.	Francs.
Abadesa[1]	ZAZ	180	Furness Houlder Argentine Lines, Ltd.	300, **600**	P G	X	0.40	—
Abaris[1]	YJC	150	Gascony S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Abbassieh[1]	ZTH	—	Khedivial Mail S.S. & Graving Dock Co.	300, **600**	P G	X	0.40	—
Abercorn[1]	BAJ	180	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—
Abereden[1]	LUT	150	Hindustan S.S. Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Aberlour[1]	EZR	150	Adam S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Abinsi[1]	MVP	220	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—
Abonema[1]	YME	160	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—
Acajutla[1]	ZHG	150	Pacific S. Navigation Co., Ltd.	300, **600**	P G	X	0.40	—
Accra ESJ[1]	ESJ	160	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—
Actor[1]	BOJ	135	T. & J. Harrison	300, **600**	P G	X	0.40	—
Addington[1]	XFK	135	A. Morphy	300, **600**	P G	X	0.40	—
Admiral Cochrane[1]	YQX	135	Byron S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Admiral Codrington[1]	BOX	125	Poverty Bay Farmers Meat Co., Ltd.	300, **600**	P G	X	0.40	—
Admiral Hamilton[1]	GBQN	160	Byron S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Admiral Hastings[1]	GCDR	155	Byron S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Adolph Woermann[1]	GBSL	—	Aberdeen Line (G. Thompson & Co.)	300, **600**	P G	X	0.40	—
Adra[1]	YHL	155	C. T. Bowring & Co., Ltd.	300, **600**	P G	X	0.40	—
Adriatic[1]	MHC	300	White Star Line	300, **600**	P G	N	0.40	—
Aeneas[1]	MFU	250	A. Holt & Co.	300, **600**	P G	X	0.40	—
Africshore[1]	VNL	—	Mitchell Cotts & Co.	300, **600**	P G	X	0.40	—
Agadir[1] GCQK	GCQK	140	Royal Mail S.S. Co.	300, **600**	P G	N	0.40	—
Agamemnon ZJK[1]	ZJK	140	A. Holt & Co.	300, **600**	P G	X	0.40	—
Agapenor[1]	ZJP	220	A. Holt & Co.	300, **600**	P G	X	0.40	—
Aguila[1]	EJF	180	Yeoward Bros.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Aidan[1]	MFM	200	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—
Ainsdale[1]	XIP	150	Alby United Carbide Factories, Ltd.	300, **600**	P G	X	0.15	1.50
Airedale[1]	OFT	150	C. A. Stewart & Co.	300, **600**	P G	X	0.40	—

Notes.

[1] Operated by the Marconi International Marine Communication Co., Ltd., London.
[2] Operated by Siemens Bros. & Co., Ltd., Woolwich, London, S.E.
[3] Operated by the owners
[4] Operated by the Soc. Française Radio-Electrique
[5] Operated by Turnbull Martin & Co.
[6] Operated by Australian Navy
[7] Operated by A. Holt & Co., mgrs., Liverpool
[8] Operated by the Federal S.N. Co.
[9] Operated by Amalgamated Wireless (Australasia), Ltd.
[10] Operated by Melbourne Navy Board.
[11] Operated by Comp. Française Maritime et Coloniale de Tel. sans fils, Paris, for and on behalf of the Marconi International Marine Co., Ltd., London
[12] Operated by Canadian Government Radio-telegraph Service, Department of Naval Service, Ottawa
[13] Operated by Admiralty

Ajana [3]	GTI	250	Australind S.S. Co.	300, 600	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—
Ajax GUZ [1]	GUZ	200	A. Holt & Co.	300, 600	P G	X	0.40	—
Akabo [1]	MZE	170	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Alatrium [1]	LUO	125	Rome S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Alaveno [1]	YHN	160	J. Glynn & Sons, Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Alban [3]	GWW	225	Booth S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Albanian [1]	ZOI	180	F. Leyland & Co., Ltd.	300, 600	P G	N	0.40	—
Albatross YDL [1]	YDL	120	Shipping Controller (Ellermann Wilson & Co.)	300, 600	P G	X	—	—
Alberta YJT [1] [16]	YJT	150	L. & S.W. Railway Co.	300, 600	P G	N	0.15	1.50
Albionstar [1]	GCBD	200	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Albistan [1]	YFW	130	Pentaff S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Albuera [1]	LTM	150	Chr. Salvesen & Co.	300, 600	P G	X	0.40	—
Alcinous [1]	ZJQ	200	A. Holt & Co.	300, 600	P G	X	0.40	—
Alconda [1]	YSL	—	Donaldson Bros., Ltd.	300, 600	P G	X	0.40	—
Aldworth [1]	ZPF	130	J. Westoll	300, 600	P G	X	0.40	—
Alda	GBZQ	—	Pacific S.N. Co.	—	—	—	—	—
Aleppo [1]	ZVU	180	Ellerman's Wilson Line, Ltd.	300, 600	P G	9 a.m. to 1 p.m. 3 p.m. to 6 p.m. 8 p.m. to 11 p.m.	0.40	—
Alesia [1]	ZQQ	180	India Office (mgrs., Grahams & Co.)	300, 600	—	X	0.40	—
Alexandra BGX	BGX	—	Alexandra Towing Co.	300, 600	P G	X	—	—
Alexandra YZH [1]	YZH	135	Woolston S.S. Co.	300, 600	P G	X	0.40	—
Alexandra Woermann [1]	GBFM	—	Shipping Controller (mgrs., White Star Line)	300, 600	P G	X	0.40	—
Alexandrian [1]	ZGM	180	F. Leyland & Co., Ltd.	300, 600	P G	N	0.40	—
Algerian Prince [1]	GCMY	170	Prince Line, Ltd.	—	—	—	—	—
Alicia XFB [1]	XFB	125	T. G. Beatley & Son, Ltd.	300, 600	P G	X	0.40	—
Alma GBJL [1]	GBJL	—	Shipping Controller (mgrs., E. T. Radcliffe & Co.)	300, 600	P G	X	—	—
Almanzora [1]	YZK	—	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Almeria [1]	GBFD	155	Shipping Controller (mgrs., J. Gardner & Co.)	300, 600	P G	X	0.40	—
Alpine Range [1]	YGH	140	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Alster [1]	GBDL	—	Shipping Controller (mgrs., Turnbull Scott & Co.)	—	—	—	—	—
Alston [1]	YKH	140	Wm. Garthwaite	300, 600	P G	X	0.40	—
Altai [1]	ZSX	140	Shipping Controller (mgrs., Ellerman's Wilson Line)	300, 600	P G	X	0.40	4.00
Altenfels [1]	GBDZ	—	Shipping Controller (mgrs., P. Henderson & Co.)	300, 600	P G	X	0.40	—
Amarna [1]	YRD	150	Moss S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Amasis [1]	YMT	160	Moss S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Amatonga [1]	ZPU	150	Ellerman & Bucknall S.S. Co.	300, 600	P G	X	0.40	—
Ambassador [1]	GXS	130	Hall Bros. S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Amber [3]	GFI	130	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—
Amberton [1]	ZVE	—	R. Chapman & Sons	300, 600	P G	X	0.40	—
American Transport [1]	ZDP	140	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—

[14] Operated by the Marconi Wireless Tel. Co. of America on behalf of the M.I.M. Com. Co., Ltd., London

[15] Operated by the officers of the ship

[16] All charges for messages through Havre and Cherbourg TSF to read:
5 words or less, 2s. 1d., plus 1½d. a word;
6 to 10 words, 1s. 3d., plus 3½d. a word;
over 10 words, 5d. a word

[17] Operated by Marconi Wireless Telegraph Co. of Canada, Ltd.

[18] Operated by the Marconi International Marine Communication Co., Ltd., on behalf of Amalgamated Wireless (Australasia), Ltd.

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Ammon [1]	GBPZ	—	Shipping Controller (mgrs., Glover Bros.)	300, **600**	P G ..	X	0.40	—	
Amsterdam [3]	GPF	130	Great Eastern Railway	300, 450, **600**	P R ..	N	0.10	1.00	
Anamba [1]	ZAV	140	Anglo-Saxon Petroleum Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Anchises [1]	MFW	250	A. Holt & Co.	300, **600**	P G ..	X	0.40	—	
Anchoria [1]	YDE	180	T. & J. Brocklebank, Ltd. ..	300, **600**	P G ..	X	0.40	—	
Ancobra [1]	YMK	160	African S.S. Co.	300, **600**	P G ..	X	0.40	—	
Andalusian [1]	XIC	130	Ellerman's Lines, Ltd.	300, **600**	P G ..	X	0.40	—	
Andes [1]	MRQ	200	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	N	0.40	—	
Andorinha [1]	MIU	130	Yeoward Bros.	300, **600**	P G ..	X	0.40	—	
Andrée ENN [1] ..	ENN	350	Green Star Shipping Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Anglesea [1]	BCR	120	Cardigan S.S. Co., Ltd. (mgrs. Jenkins Bros.)	300, **600**	P G ..	X	0.40	—	
Anglier [1]	YAG	125	Brys & Gylsen	300, **600**	P G ..	X	—	—	
Anglo-Chilean [1] ..	ZRS	170	Nitrate Producers S.S. Co., Ltd...	300, **600**	P G ..	N	0.40	—	
Anglo-Egyptian [1] ..	YUM	160	Nitrate Producers S.S. Co., Ltd...	300, **600**	P G ..	X	0.40	—	
Anglo-Mexican [1] ..	YYC	140	Nitrate Producers S.S. Co., Ltd...	300, **600**	P G ..	N	0.10	—	
Anglo-Saxon [1]	GUB	140	Nitrate Producers S.S. Co., Ltd...	300, **600**	P G ..	N	0.40	—	
Anna Doretta Boog [1] ..	GBXK	—	C. Doresa & Co.	300, **600**	P G ..	X	0.40	—	
Anne [1]	GHL	—	Shipping Controller (F. C. Strick & Co., Ltd.)	300, **600**	P G ..	X	—	—	
Anni [1]	GBJY	—	Shipping Controller (Hall Bros.)..	300, **600**	P G ..	X	0.40	—	
Anselm [1]	MDK	180	Booth S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Anselma de Larrinaga [1]	EJR	180	Anselma de Larrinaga S.S. Co., Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 p.m. to 10 p.m.	0.40	—	
Answald [1]	GBYL	—	Cunard S.S. Co.	—	—	—	—	—	
Antar [1]	MCX	135	Wigan S.N. Co.	300, **600**	P G ..	X	0.40	—	
Antigone EUA [1] ..	EUA	130	Egypt & Levant Lines S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Antillian [1]	MJL	200	F. Leyland & Co., Ltd.	300, **600**	P G ..	N	0.40	—	
Antilochus [1]	GTC	140	A. Holt & Co.	300, **600**	P G ..	X	0.40	4.00	
Antinous [1]	ZCN	135	Egypt & Levant S.S. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Antiope [1]	GMX	—	Egypt & Levant S.S. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Antrim GPN [3]	GPN	150	Midland Railway Co.	300, 400, **600**	P R ..	N	0.05	0.50	
Antwerpen [1]	GBMP	130	Shipping Controller (W. A. Young & Co.)	300, **600**	P G ..	X	0.40	—	

Apollo GXC[1]	GXC	160	Bolivian General Enterprise, Ltd.	300, 600	P G ..	X	0.40	—
Appalachee GCQS[1] ..	GCQS	140	Anglo-American Oil Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Appam[1]	GDJ	250	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Appleby[1]	BAK	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Appleleaf[1]	ZVI	200	Lane & MacAndrew, Ltd. ..	300, 600	P G ..	X	0.40	—
Apsley[1]	EUQ	145	Fawcett, Coverdale & Co. ..	300, 600	P G ..	X	0.40	—
Apsleyhall[1]	BCZ	150	West Hartlepool S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Aquitania[1]	MSU	500	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Arabia GBPD[1] ..	GBPD	—	Shipping Controller (Halden & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Arabian Prince[1] ..	XIY	150	Furness, Withy & Co., Ltd. ..	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Arabier[1]	EOL	150	Lloyd Royal Belge (Gt. Britain) ..	300, 600	P G ..	X	0.40	—
Arabistan[1]	ZMA	150	F. C. Strick & Co., Ltd.	300, 600	P G ..	X	0.40	—
Arachne[1]	YAV	150	Stella S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Aragaz[1]	ZZR	135	Aragaz Tank S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Araguaya[1]	MBG	160	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Arakaka[1]	GUA	140	Booker Bros., MacConnell & Co. ..	300, 600	P G ..	X	0.40	—
Aral[1]	ZVF	135	H. E. Moss & Co.	300, 600	P G ..	X	0.40	—
Arana[1]	GCKF	115	MacAndrew & Co., Ltd.	—	—	—	—	—
Arankola GCQT[1] ..	GCQT	180	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Aras[1]	YZP	120	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
Arawa[1]	MWE	200	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Arbeeco[1]	EIM	130	R. Brining & Co.	300, 600	P G ..	X	0.40	—
Arbroath[1]	YPX	150	Dundee, Perth & London S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Archangel[3]	ZCP	120	Great Eastern Railway	300, 450, 600	P R ..	N	0.10	1.00
Archimedes[1]	YQC	170	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Architect[1]	ZHH	180	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Ardenhall[1]	YCE	140	Hazelwood Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Ardeola[1]	GCJ	180	Yeoward Bros.	300, 600	P G ..	X	0.40	—
Ardgoil[1]	YVA	140	Lang & Fulton, Ltd.	300, 600	P G ..	X	0.40	—
Ardgowan[1]	XMY	130	Lang & Fulton, Ltd.	300, 600	P G ..	X	0.40	—
Ardoyne[1]	YND	140	Stella Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Arensburg[1]	GBFQ	—	Shipping Controller (G. Heyn & Sons)	300, 600	P G ..	X	0.40	—
Argalia[1]	XLH	—	Donaldson Bros., Ltd.	300, 600	P G ..	X	0.40	—
Argonauta[1]	YAA	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Argyllshire[5]	GTJ	220	Scottish Shire Line, Ltd. ..	300, 450, 600	P G ..	9 a.m. to 12.30 p.m., 1 p.m. to 2 p.m. 4 p.m. to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Ariadne Christine[1] ..	EUT	130	P. Samuel & Co., Ltd.	300, 600	P G ..	X	0.40	—
Ariadne Irene[1] ..	EUS	130	P. Samuel & Co., Ltd.	300, 600	P G ..	X	0.40	—
Ariano[1]	YFG	—	Gulf Line, Ltd.	300, 600	P G ..	X	0.40	—
Ariosto[1]	ZJB	—	Ellerman's Wilson Line	300, 600	P G ..	9 a.m. to 1 p.m. 3 p.m. to 6 p.m. 8 p.m. to 11 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Arlanza GCQV [1]	GCQV	280	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Armadale Castle [1]	MQG	240	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Armagh [16]	BMZ	200	Union S.S. of New Zealand, Ltd.	300, **600**	P G	N	0.40	—	
Arncliffe [1]	GXX	150	Care & Marquand Shipping Co.	300, **600**	P G	X	0.40	—	
Aro [1]	YDG	130	Pyman Ball & Co., Ltd.	300, **600**	P G	—	0.40	—	
Aronda [1]	MAZ	220	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Arracan [2]	GWO	180	British & Burmese S.N. Co., Ltd.	300, **600**	P G	10 a.m. to 12 n. 2 p.m. to 4 p.m. 8 p.m. to 12 (midnight)	0.40	—	
Arranmoor [1]	YID	140	W. Runciman & Co., Ltd.	300, **600**	P G	X	0.40	—	
Arratoon Apcar	VUE	—	The British India S.N. Co., Ltd.	—	—	—	—	—	
Artemisia [1]	GBDC	—	Shipping Controller (Rankin, Gilmour & Co.)	300, **600**	P G	X	0.40	—	
Arundel [3]	MDZ	135	London, Brighton & S. Coast Railway	300, **600**	P G	N	0.15	1.50	
Arzila GCQW [1]	GCQW	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Ascanius [1]	MFV	200	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Aschenburg [1]	GBDY	—	Shipping Controller (Rankin, Gilmour & Co.)	300, **600**	P G	X	0.40	—	
Ascot [1]	MKZ	135	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Asgard [1]	GBZV	—	E. T. Radcliffe	300, **600**	P G	X	0.40	—	
Ashpark [1]	GCMQ	—	J. & J. Danelm	—	—	—	—	—	
Ashtabula GKC [1]	GKC	150	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—	
Ashwin [1]	ZQX	150	A. J. Ashwin	300, **600**	P G	X	0.40	—	
Asian [1]	MKL	200	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Asiatic [1]	GUX	130	Stella S.S. Co., Ltd.	300, **600**	P O	X	0.40	—	
Aspenleaf [1]	EQF	—	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Assaye [1]	MOO	155	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Assiout [1]	ERL	150	Moss S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Astraea MOX [1]	MOX	144	Cardiff S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Astrakhan [1]	YBG	—	H. E. Moss & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Astronomer [1]	LUY	160	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Asturian [1]	EMG	150	Ellerman's Lines, Ltd.	300, **600**	P G	X	0.40	—	
Astyanax [1]	ZKF	150	A. Holt & Co.	300, **600**	P G	X	0.40	—	

Asuncion de Larrinaga[1]	EMB	150	Larrinaga & Co., Ltd.	300, 600	P G	X	0.40	—	
Athenic MWN[1]	MWN	200	White Star Line	300, 600	P G	X	0.40	—	
Athenic ZUL[1]	ZUL	150	Katharine S.S. Co.	300, 600	P G	X	0.40	—	
Atholl[1]	BVY	170	Australind S.S. Co.	300, 600	P G	X	0.40	—	
Atlanten[1]	XMR	—	Shipping Controller (Elder Dempster)	300, 600	P G	X	0.40	—	
Atlantic[1]	YLJ	125	W. H. Cocker & Co.	300, 600	P G	X	0.40	—	
Atlantic City[1]	BTY	—	W. R. Smith & Sons	300, 600	P G	X	0.40	—	
Atreus[1]	ZKG	180	A. Holt & Co.	300, 600	P G	X	0.40	—	
Atta[1]	GBKW	—	Shipping Controller (J. Gardner & Co.)	300, 600	P G	X	0.40	—	
Atto[1]	GBLQ	—	Shipping Controller (Holder, Middleton & Co.)	300, 600	P G	X	0.40	—	
Augsberg[1]	GBLC	—	Shipping Controller (Watts, Watts & Co.)	300, 600	P G	X	0.40	—	
August Wilke[1]	GBZK	130	Burdick & Cook	—	—	—	—	—	
August Belmont	ELL	—	Pensacola Trading Co.	300, 600	P G	X	0.40	—	
Auguste Halenke[1]	EXN	130	J. MacKelvie & Co.	300, 600	P G	X	0.40	—	
Auldmuir[1]	XEL	130	Glen & Co.	300, 600	P G	X	0.40	—	
Aungban[1]	YFI	180	Burmab Oil Co.	300, 600	P G	X	0.40	—	
Aureole[1]	YMW	145	Hunting & Sons	300, 600	P G	X	0.40	—	
Australia[1]	YSN	160	British India S.N. Co.	300, 600	P G	X	0.40	—	
Australier[1]	XJU	—	Lloyd Royal Belge (Great Britain)	300, 600	P G	X	0.40	—	
Australind[2]	GQW	250	Australind S.S. Co.	300, 600	P G	9.15 a.m. to 1 p.m., 4.30 p.m. to 12 p.m.	0.40	—	
Austria[1]	GBMT	—	Shipping Controller (F. & W. Ritson)	300, 600	P G	X	0.40	—	
Austrian[1]	EMH	130	Ellerman's Lines, Ltd.	300, 600	P G	X	0.40	—	
Author[1]	YJN	—	T. & J. Harrison	300, 600	P G	X	0.40	—	
Avon MBO[1]	MBO	160	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—	
Aydon[1]	GZG	—	Leopold Walford (London), Ltd.	300, 600	P G	X	0.40	—	
Aylesbury[1]	MRJ	140	Alexandra S.S. Co.	300, 600	P G	X	0.40	—	
Aylestone[1]	ZJX	140	Alexander Bros.	300, 600	P G	X	0.40	—	
Aymeric[1]	GBJV	180	Andrew Weir & Co.	300, 600	P G	X	—	—	
Ayrshire[5]	GQA	220	Scottish Shire Line, Ltd.	300, 450, 600	P G	9 to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—	
Backworth[1]	GCBZ	—	R. S. Dalgliesh	—	—	—	—	—	
Badagry[1]	YEC	—	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—	
Badenia[1]	GBZD	—	A. Holt & Co.	300, 600	P G	X	0.40	—	
Bahia Castello[1]	GBSC	—	G. Thompson & Co.	300, 600	P G	X	0.40	—	
Bahadur[1]	XTK	155	Asiatic S.N. Co., Ltd.	300, 600	P G	X	0.40	—	
Bakana[1]	YCQ	—	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—	
Baldina[1]	XXE	—	Adelaide S.S. Co., Ltd.	—	—	—	—	—	
Balfe[1]	GCQB	—	Lamport & Holt, Ltd.	—	—	—	—	—	
Ballygally Head[1]	GBRK	170	Ulster S.S. Co., Ltd.	300, 600	P G	X	0.40	—	
Balmoral Castle[1]	MPW	250	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—	
Baltic MBC[1]	MBC	180	White Star Line	300, 600	P G	N	0.40	—	
Baluchistan[1]	YXK	130	Hindustan S.S. Co., Ltd.	300, 600	P G	X	0.40	—	
Bamora[1]	MST	180	British India S.N. Co.	300, 600	P G	X	0.40	—	
Bampton[1]	LSQ	—	Medit. Cargo Steamers, Ltd.	300, 600	P G	X	0.40	—	
Bampton Castle[1]	YBF	—	Union-Castle Mail S.S. Co.	300, 600	P G	X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Banca [1]	MFS	170	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Banchory [1]	ZQS	125	Globe Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Bandra [1]	MCH	185	British India S.N. Co.	300, **600**	P G	X	0.40	—	
Bangala [1]	GAC	180	British India S.N. Co.	300, **600**	P G	X	0.40	—	
Bankdale [1]	ENF	250	Japp, Hatch & Co., Ltd.	300, **600**	P G	X	0.40	—	
Bankura [1]	GCH	160	British India S.N. Co.	300, **600**	P G	X	0.40	—	
Baraccoo [1]	YEF	—	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Barala [1]	GCM	170	British India S.N. Co.	300, **600**	P G	X	0.40	—	
Barbadian [1]	GBQM	180	F. Leyland & Co., Ltd.	300, **600**	P G	X	0.40	—	
Bardic [1]	BEM	170	White Star Line	300, **600**	P G	X	0.40	—	
Barima [1]	ZNB	125	Royal Mail Steam Packet Co.	300, **600**	P G	X	0.40	—	
Barjora [1]	GCT	175	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Barlby [1]	BTT	130	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Barmoor [1]	EZX	—	Burnett & Co.	300, **600**	P G	X	0.40	—	
Baroda [1]	GDL	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Baron Ailsa [1]	XES	170	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Ardrossan [1]	MWW	160	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Berwick [1]	MSS	130	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Blantyre [1]	XLN	—	H. Hogarth & Sons	—	—	—	—	—	
Baron Cathcart [1]	ZRI	125	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Douglas [1]	ODD	—	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Elcho [1]	ZPP	150	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baronesa [1]	ZQA	120	Furness Houlder Argentine Lines, Ltd.	300, **600**	P G	6 to 8 a.m, 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	—	—	
Baron Fairlie [1]	LUZ	185	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Garioch [1]	GBNC	175	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Inchcape [1]	BAU	185	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Jedburgh [1]	MGD	180	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Kelvin [1]	BOT	125	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Baron Minto [1]	YEK	185	H. Hogarth & Sons	300, **600**	P G	X	0.40		
Baron Napier [1]	MJS	165	H. Hogarth & Sons	300, **600**	P G	X	0.40		
Baron Polwarth [1]	GRB	185	H. Hogarth & Sons	300, **600**	P G	X	0.40		
Baron Sempill [1]	ZFP	150	H. Hogarth & Sons	300, **600**	P G	X	0.40		
Barotse [1]	ZPR	130	Ellerman Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Barpeta [1]	MPR	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40		
Barranca [1]	MLL	135	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40		

Bassa[1]	YYJ	130	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Bassam[1]	ZMJ	—	Elder Dempster & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Bassano[1]	YQA	155	Ellerman's Wilson Line, Ltd.	300, 600	P G	9 a.m. to 1. p.m 3 to 6 p.m. 8 to 11 p.m.	0.40	—
Bata[1]	GBST	180	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Batanga[1]	YEB	155	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Bathurst[1]	GBPM	120	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Batsford[1]	ZXL	170	Canadian Pacific Railway Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Bavarian[1]	ZTU	135	Graham, Smith	300, 600	P G	X	0.40	—
Bayano[1]	GMK	200	Elders & Fyffes, Ltd.	300, 600	P G	—	0.40	—
Baycross[1]	ZVZ	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baydouglas[1]	ETU	170	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayersher[1]	YAO	130	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayford BEL[1]	BEL	185	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baygola[1]	ZXW	170	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baygowan[1]	ZVY	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayhowel[1]	LUW	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayleaf[1]	**EZH**	**185**	**Lane & Macandrew, Ltd.**	**300, 600**	**P G**	**X**	**0.40**	—
Baylula[1]	BAF	170	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baymano[1]	YHX	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baymanter[1]	BAD	170	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baymingo[1]	YHP	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayramento[1]	YCW	—	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baysarnia[1]	YNW	155	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baysarua[1]	EQO	160	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Baytigern[1]	ESP	185	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayusona[1]	BEV	130	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bayverdun[1]	ZXX	170	The Bay S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Beacon Grange[1]	GCQL	185	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Beaverton	XTO	—	Leopold Walford, Ltd., London	300, 600	P G	X	—	—
Beckenham[1]	EWU	—	Watts, Watts & Co.	300, 600	P G	X	0.40	—
Beechleaf[1]	EZG	185	Anglo-Saxon. Pet. Co., Ltd.	300, 600	P G	X	0.40	—
Beechpark[1]	GCBR	—	J. & J. Denholm	300, 600	P G	X	0.40	—
Beechwood[1]	YAE	185	J. I. Jacobs & Co.	300, 600	P G	X	0.40	—
Belgian[1]	GCNM	200	Leyland Line	—	—	—	—	—
Belgic[1]	ZXC	200	International Nav. Co., Ltd.	300, 600	P G	X	0.40	—
Beldina[1]	XXE	—	Adelaide S.S. Co.	300, 600	P G	X	0.40	—
Belgravian[1]	OEK	130	Graham, Smith	300, 600	P G	X	0.40	—
Belize BEO[1]	BEO	120	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Bellerby[1]	ESY	130	Sir R. Ropner & Co.	300, 600	P G	X	0.40	—
Bellerophon[1]	GTD	120	A. Holt & Co.	300, 600	P G	X	0.40	—
Bellfield[1]	YDZ	135	J. Bell & Co.	300, 600	P G	X	0.40	—
Belltown[1]	ZCD	135	J. Bell & Co.	300, 600	P G	X	0.40	—
Bellview[1]	GCDM	—	J. Bell & Co.	300, 600	P G	X	0.40	—
Beltana[1]	MKR	175	P. & O. Steam N. Co.	300, 600	P G	X	0.40	—
Bembridge[1]	YKX	150	J. Temperley	300, 600	P G	X	0.40	—
Benalder[1]	ENS	200	Wm. Thomson & Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Benalla [1]	GBJ	220	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Benarty [1]	YLT	220	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benavon [1]	EJD	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Bencleuch [1]	ZZA	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Bendoran [1]	YEM	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Bendu [1]	ZME	185	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Benedict [1]	ZKY	170	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Benefactor [1]	MOE	185	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Benguela [1]	ZMQ	—	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Benin [1]	ZMR	170	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Benlawers [1]	YJS	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benledi [1]	YLU	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benlomond [1]	LTC	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benmohr [1]	BDO	135	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Ben Nevis [1]	GYX	130	Watson Bros.	300, **600**	P G	X	0.40	—	
Benrinnes [1]	EKC	200	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benue [1]	ZMF	155	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Benvenue [1]	EPQ	185	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Ben Voirlich [1]	GCFB	—	W. Thomson & Co.	300, **600**	P G	X	0.40	—	
Benwood [1]	YCA	155	Petersen & Co., Ltd.	300, **600**	P G	X	0.40	—	
Berbice [1]	GIF	155	Royal Mail Steam Packet Co.	300, **600**	P G	X	0.40	—	
Bereby [1]	YDC	170	Elder Dempster & Co.	300, **600**	P G	X	0.40	—	
Berlin [1]	GCRM	—	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Bermuda [1]	GBDJ	—	Lawther, Latta & Co.	300, **600**	P G	X	0.40	—	
Bernini [1]	XFE	150	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Berriedale [1]	LUI	170	Albiana S.S. Co.	300, **600**	P G	X	0.40	—	

Berrima [1]	YWR	220	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Berwick Castle [1] ..	GCQN	200	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Berwindmoor [1]	GCQP	155	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Berwindvale [1]	GCQX	155	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Betwa [1]	BDZ	190	James Nourse, Ltd.	300, 600	P G ..	X	0.40	—
Bhamo [2]	GWA	140	P. Henderson & Co.	300, 600	P G ..	10 a.m. to 12 n. 4 to 6 p.m. 8 p.m. to 12 midnight	0.40	—
Bharata [1]	GAD	200	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Biafra [1]	YCF	180	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Biarritz [2]	EZN	—	S.E. & Chatham Rly. Co. ..	300, 600	P G ..	—	—	—
Bideford [1]	BOA	145	H. Roberts & Sons	300, 600	P G ..	X	0.40	—
Biela [1]	YNC	140	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Bilbster [1]	BUC	145	J. Walford, Ltd.	300, 600	P G ..	X	0.40	—
Binfield [1]	GBMV	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Birchleaf EYD [1] ..	EYD	170	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
Blackheath [1]	EWW	120	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Blackhill [1]	BCC	—	Consett Iron Co.	300, 600	P G ..	X	0.40	—
Black Prince [1]	YJB	150	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Blackwell [1]	ZLC	170	Well Line, Ltd.	300, 600	P G ..	8 a.m. to 12 n. 2 to 6 p.m. 8 p.m. to 12 midnight	0.40	—
Blairmore [1]	BOB	145	Fisher, Renwick & Co.	300, 600	P G ..	X	0.40	—
Blakemoor [1]	ESV	160	T. G. Berg	300, 600	P G ..	X	0.40	—
Bloemfontein [1] ..	GBN	150	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Bloomfield [1]	LSU	135	Hunting & Son	300, 600	P G ..	X	0.40	—
Bodnant [1]	YCO	—	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Bogota [1]	YAC	180	Pacific Steam N. Co.	300, 600	P G ..	X	0.40	—
Bohemian [1]	MEL	150	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Bolton Castle [1]	MAQ	150	J. Chambers & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Bonny [1]	XIN	160	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Boonah VJQ	VJQ	—	Australian Commonwealth ..	—	—	—	—	—
Booral	CGH	—	Australian Commonwealth ..	—	—	—	—	—
Boorara [6]	VJT	150	Australian Commonwealth ..	300, 600	—	N	—	—
Borda [1]	MFQ	220	P. & O. S.N. Co.	300, 600	P G ..	X	0.40	—
Borderer [1]	GCL	150	H. H. McAllester	300, 600	P G ..	X	0.40	—
Borderland [1]	MUM	—	J. Currie & Co.	300, 600	P G ..	X	0.40	—
Borodino [1]	ODT	—	Ellerman's Wilson Line, Ltd ..	300, 600	P G ..	X	0.40	—
Boscombe Chine [1] ..	XEG	150	J. Slater	300, 600	P G ..	X	0.40	—
Bosnian [1]	OEL	120	Graham, Smith	300, 600	P G ..	X	0.40	—
Bosporus [1]	GBMN	—	B. J. Sutherland & Co.	300, 600	P G ..	X	0.40	—
Botanist [1]	MAP	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Boukadra [1]	YGB	145	F. C. Strick & Co., Ltd.	300, 600	P G ..	X	0.40	—
Boulama [1]	YMJ	160	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Bournmouth [1]	ZJD	145	Leeston Shpg. Co.	300, 600	P G ..	X	0.40	—
Boutry [1]	YCZ	—	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Boveric [1]	YNY	135	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Boverton [1]	XHK	145	E. Thomas, Radcliffe & Co., Ltd.	300, 600	P G ..	X	0.40	—
Bovic [1]	GDO	210	White Star Line	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Boyne ZUY [1]	ZUY	145	E. Hain & Son	300, **600**	P G	X	0.40	—	
Brabandier [1]	EUM	140	Lloyd Royal Belge, Ltd., London	300, **600**	P G	X	0.40	—	
Bradavon [1]	XLG	160	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Bradford City [1]	GBCL	150	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Bradboyne [1]	BSW	150	W. R. Smith & Sons	—	—	—	—	—	
Bradclyde [1]	YRB	150	W. R. Smith & Sons	—	—	—	—	—	
Braemar Castle [1]	GCQZ	260	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Brambleleaf [1]	ZZO	—	Lane & Macandrew, Ltd.	300, **600**	P G	X	0.40	—	
Brandenburg GBYK [1]	GBYK	—	R. MacKill & Co.	—	—	—	—	—	
Brandenburg GBSF [1]	GBSF	—	A. Holt & Co.	—	—	—	—	—	
Braunfels [1]	BPG	—	Grahams & Co.	300, **600**	P G	X	0.40	—	
Brazilier [1]	OET	150	Lloyd Royal Belge, Ltd., London	300, **600**	P G	X	0.40	—	
Breconian [1]	YEW	120	J. Ridley, Son, & Tully	300, **600**	P G	X	0.40	—	
Bremen [1]	GBJK	—	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Brendon [1]	BEK	135	Medit. Cargo Steamers, Ltd.	300, **600**	P G	X	0.40	—	
Brescia ESS [1]	ESS	165	Cunard S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Bretanier [1]	EXP	140	Lloyd Royal Belge, Ltd., London	300, **600**	P G	X	0.40	—	
Bretwalda [1]	GBJR	170	Hall Bros. S.S. Co.	300, **600**	P G	X	0.40	—	
Breynton [1]	LSZ	145	Humphries Cardiff, Ltd.	300, **600**	P G	X	0.40	—	
Briarleaf [1]	EYA	200	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Briarwood [1]	ZGD	140	J. Constantine & Son	300, **600**	P G	X	0.40	—	
Brighton BNF [1]	BNF	130	R. Chapman & Son	300, **600**	P G	X	0.40	—	
Brighton MOV [3]	MOV	95	L.B. & S.C.R. Co.	300, **600**	P G	N	0.15	1.50	
Britannia GFV [3]	GFV	140	Eastern Telegraph Co.	300, 450, **600**	P	—	0.40	—	
British Admiral [1]	ZYY	170	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Baron [1]	EYU	200	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Beacon [1]	BOU	155	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Duke [1]	EYY	170	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Earl [1]	EYS	140	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Emperor [1]	ZLK	175	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Empress [1]	ZYZ	160	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Ensign [1]	ZYV	150	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British General [1]	YJE	—	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Isles [1]	ZYW	150	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Knight [1]	EYN	130	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Lantern [1]	BON	140	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Light [1]	BOD	120	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
British Major [1]	BLN	160	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	

British Marquis[1]	EYW	150	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Marshal[1]	YJJ	—	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Peer[1]	EYM	150	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Princess[1]	ZYT	180	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Sovereign[1]	ZYU	150	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Star[1]	BOI	150	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
British Transport[1]	ZDT	145	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
British Viscount[1]	EYT	190	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—
Briton[1]	MQJ	250	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Broadmayne[1]	EXX	140	Jacobs & Co.	300, 600	P G	X	0.40	—
Brodholme[1]	YVR	170	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodhurst[1]	YSC	160	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodlea[2]	YVY	220	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodliffe[2]	YVS	220	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodmead[1]	MRO	190	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodmount[1]	MYP	250	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Brodsworth[1]	ESE	140	R. S. Dalgliesh	300, 600	P G	X	0.40	—
Brodvale[1]	MRB	250	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Bronte[1]	GCPZ	—	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Broompark[1]	YIH	135	J. & J. Denholm	300, 600	P G	X	0.40	—
Browning[1]	GCBL	—	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Bruyere[1]	GCBM	165	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Bryntawe[1]	BSR	140	Times Shipping Co., Ltd.	300, 600	P G	X	0.40	—
Buckleigh[1]	BDY	160	Medit. Cargo Steamers, Ltd.	300, 600	P G	X	0.40	—
Bulimba[1]	XGG	170	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Bulla	VJP	—	Australian Commonwealth	—	—	—	—	—
Buranda[1]	LSY	145	Burdick & Cook	300, 600	P G	X	0.40	—
Burdale[1]	XFM	120	Burdick & Cook	300, 600	P G	X	0.40	—
Burgermeister Schroder[1]	GBCS	—	Bell Bros. & Co.	—	P G	X	0.40	—
Burgondier[1]	OEZ	—	Lloyd Royal Belge, Ltd., London	300, 600	P G	X	0.40	—
Burgundy[1]	BDM	170	D. MacIver, Sons & Co., Ltd.	300, 600	P G	X	0.40	—
Burma GVT[2]	GVT	140	P. Henderson & Co.	300, 600	P G	10 a.m. to 12 n. 2 to 4 p.m. 8 p.m. to 12 midnight	0.40	—
Burmese Prince[1]	GRP	200	Furness, Withy & Co., Ltd.	300, 600	P G	N	0.40	—
Burnholme[1]	ELV	—	Headlam & Rowland	300, 600	P G	X	—	—
Burnhope[1]	GXQ	—	Burnett S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Bury[1]	ODK	—	Great Central Railway	300, 600	P G	X	0.40	—
Butetown[1]	BBH	—	Harrison, Sons & Co.	300, 600	P G	X	0.40	—
Byron[1]	GDH	250	Lamport & Holt, Ltd.	300, 600	P G	N	0.40	—
Cabotia[1]	YFH	180	Donaldson Line	300, 600	P G	X	0.40	—
Cadillac[1]	EYF	160	J. Hamilton	300, 600	P G	X	0.40	—
Caesarea[1, 16]	MSZ	250	L. & S.W. R. Co.	300, 600	P G	N	0.15	1.50
Cairndhu[1]	YVO	180	Cairns, Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Cairngowan[1]	EWZ	170	Cairns, Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Cairnmona[1]	ZFC	155	Cairns, Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Cairnvalona[1]	XJK	155	Cairns, Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Caithness[1]	YCX	—	A. M. Sutherland	300, 600	P G	X	0.40	—
Calabria MAJ[2]	MAJ	200	Henderson Bros.	300, 600	P G	N	0.40	—
Calcutta[1]	GCZR	—	Anglo-American Oil Co.	—	—	—	—	—
Calderon[1]	GBWZ	110	MacAndrews & Co.	300, 600	P G	X	—	—
Caledonia[1]	MNU	230	P. & O. S.N. Co., Ltd.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Caledonian [1]	MDT	150	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Caloric [1]	YRP	150	A. Weir & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Calulu	VZV	—	Australian Commonwealth	—	—	—	—	—	
Camana [1]	ZXQ	120	Blue Star Line, Ltd.	300, **600**	P G	X	0.40	—	
Cambria MCG [2]	MCG	170	Eastern Telegraph Co.	300, 450, **600**	P	—	0.40	—	
Cambria GRG [2]	GRG	170	L. & N.W. Railway	300, **600**	P G	N	0.05	0.50	
Cambrian MNT [1]	MNT	180	A. Lunn	300, **600**	P G	X	0.40	—	
Cambrian King [1]	EWK	160	J. Glynn & Sons, Ltd.	300, **600**	P G	X	0.40	—	
Camerata [1]	ETT	135	F. C. Strick & Co., Ltd.	300, **600**	P G	X	0.40	—	
Cameronian [1]	GLI	200	F. Leyland & Co., Ltd.	300, **600**	—	—	—	—	
Camillo [1]	YNF	160	C. T. Bowring & Co., Ltd.	300, **600**	P G	X	0.40	—	
Camito [1]	YSK	230	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40	—	
Camoens [1]	ZBB	170	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Campfield [1]	YRV	—	Rees, Jones	300, **600**	P G	X	—	—	
Campus [1]	BGH	140	H. Hogarth & Sons	300, **600**	P G	X	0.40	—	
Canada MCF [1]	MCF	260	British & North Atlantic S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Canadian Transport [1]	ZDU	130	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Canadier [1]	BCP	160	Lloyd Royal Belge, Ltd.	300, **600**	P G	X	0.40	—	
Canara [1]	GAF	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Canastota [1]	YSO	300	Canastota S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Canning [1]	GKG	210	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Canopic [1]	MPC	170	White Star Line	300, **600**	P G	N	0.40	—	
Capac [1]	GXI	180	Job Bros.	300, **600**	P G	X	0.40	—	
Cape Breton [1]	EQE	190	Lyle Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Cape Colony [1]	EYV	—	British Africa S.S. Co., Ltd.	—	—	—	—	—	
Cape Corso [1]	EWD	170	Sir Wm. Garthwaite	300, **600**	P G	X	0.40	—	
Capelcastle [1]	BCS	100	Anglo-European S.S., Coal and Pitwood Co.	300, **600**	P G	X	0.40	—	
Capel Hall [1]	ZLF	—	H. W. Rennie	300, **600**	P G	X	—	—	
Capelpark [1]	XEE	145	A. Capel & Co., Ltd. (S. Wales)	300, **600**	P G	X	0.40	—	
Cape Natal [1]	XJW	150	British Africa S. & C. Co., Ltd.	300, **600**	P G	X	0.40	—	
Cape of Good Hope [1]	XMP	—	British Africa S. & C. Co., Ltd.	—	—	—	—	—	
Cap Finisterre [1]	GBZL	—	Orient S.N. Co., Ltd.	300, **600**	—	—	—	—	
Cape Ortegal [1]	ZTY	—	Lyle Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	

Cape Premier[1]	XXO	—	British Africa S. & C. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Cape Transport[1] ..	ZDS	140	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Cap Polonio[1]	GBMD	—	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Cap Verde[1]	GBTC	—	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Caraquet[1]	MQD	170	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Carawa	CGO	200	Australian Commonwealth ..	300, 600	O ..	1.30 to 2.30 a.m. 6.30 to 11.30 a.m.	0.20	—
Cardiff[1]	EXW	135	R. W. J. Sutherland & Co. ..	300, 600	P G ..	X	0.40	—
Cardiff Hall[1]	ZUZ	135	Hansen Bros., Ltd.	300, 600	P G ..	X	0.40	—
Cardigan[1]	BCQ	170	Jenkins Bros.	300, 600	P G ..	X	0.40	—
Cardiganshire[1]	MAU	200	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Cardium[1]	MZB	200	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Carib Prince[1]	ZBU	150	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Carina	VZM	—	Australian Commonwealth ..	—	—	—	—	—
Carisbrook[1]	EKF	—	J. Good & Sons, Ltd.	300, 600	P G ..	X	0.40	—
Carisbrook Castle[1] ..	MOW	200	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Carlow Castle[1]	YDB	165	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Carmania[1]	MAA	200	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Carmarthenshire[1] ..	MUS	220	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Carnarvonshire[1] ..	MZR	220	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Carolus[1]	GDBL	125	Ohlson S.S. Co., Ltd.	—	—	—	—	—
Caronia[1]	MRA	350	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Carpentaria[1]	MHG	190	British India Steam N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Carperby[1]	BTS	120	Sir R. Ropner & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Carrigan Head[1] ..	ZKT	150	G. Heyn & Sons	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Carron[1]	LSP	—	Carron Co.	300, 600	—	X	—	—
Carston[1]	GXY	150	Christie & Co.	300, 600	P G ..	X	0.40	—
Carventum[1]	GIX	—	Fisher, Alimonda & Co.	300, 600	P G ..	X	0.40	—
Cassandra[1]	MED	200	Donaldson Bros., Ltd., and Anchor Line, Ltd.	300, 600	P G ..	X	0.40	—
Cassis[1]	MPO	160	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Castalia MWZ[1] ..	MWZ	180	Anchor Line, Ltd.	300, 600	P G ..	X	0.40	—
Castillano[1]	XKZ	150	Gulf Line, Ltd.	—	—	—	—	—
Castillian[1]	GBVX	—	Ellerman Line, Ltd.	300, 600	P G ..	X	0.40	—
Castlemoor[1]	YIE	145	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Catalina ZHL[1] ..	ZHL	210	Royal Mail Steam Packet Co. ..	300, 600	P G ..	X	0.40	—
Caterino[1]	ZFI	170	Gulf Line, Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Catherine Apcar[1] ..	YUR	—	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Cauca[1]	GVZ	140	Pacific S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Cavour[1]	YOR	200	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Cawdor Castle[1] ..	GCRF	170	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—
Cedar Branch[1] ..	YMP	170	F. & W. Ritson	300, 600	P G ..	X	0.40	—
Cedric[1]	MDC	250	White Star Line	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Celtia	ZQO	—	Harley & Miller, Ltd.	300, **600**	P G	X	—	—	
Celtic MLC [1]	MLC	250	White Star Line	300, **600**	P G	N	0.40	—	
Celtic Prince [1]	XIX	120	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Cento [1]	GVR	145	W. R. Davies & Co.	300, **600**	P G	X	0.40	—	
Central No. 1 [2]	BBI	—	Great Central Railway	300, **600**	P G	X	—	—	
Ceramic [1]	MCP	250	White Star Line	300, **600**	P G	X	0.40	—	
Cervantes [1]	GBXC	140	MacAndrews & Co., Ltd.	300, **600**	P G	X	0.40	—	
Chakdara [1]	MUO	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Chakdina [1]	MZY	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Chakla [1]	MWQ	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Chakrata [1]	GPE	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Chaleur [1]	GMN	220	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Chalister [1]	ESF	170	Donaldson Line	300, **600**	P G	X	0.40	—	
Chama [1]	ZLZ	190	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Chanda [1]	GPT	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Changuinloa [1]	MPM	200	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40	—	
Chatham ZSH [1]	ZSH	—	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Chaudiere [1]	GDK	180	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Chemnitz [1]	GBCJ	—	J. Chambers & Co.	300, **600**	P G	X	0.40	—	
Chenab [2]	GWK	115	James Nourse, Ltd.	300, **600**	P G	X	0.40	—	
Cheniston [1]	OCH	140	T. Pratt & Co.	300, **600**	P G	X	0.40	—	
Chepstow Castle [1]	ZAN	150	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Cherry Branch [1]	YYZ	160	F. & W. Ritson	300, **600**	P G	N	0.40	—	
Cherryleaf [1]	ZZN	220	Lane & Macandrew, Ltd.	300, **600**	P G	X	0.40	—	
Chertsey [1]	YDM	200	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Cheyenne GCRK [1]	GCRK	145	J. Hamilton	300, **600**	P G	X	0.40	—	
Chicago City [1]	BQX	150	C. Hills & Co.	300, **600**	P G	X	0.40	—	
Chignecto [1]	MBV	220	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Chile GCRL [1]	GCRL	220	Pacific S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Chilier [1]	BUQ	—	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	0.40	—	
China MMU [1]	MMU	250	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	

Chindwara[1]	GAR	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Chindwin[2]	GWG	180	P. Henderson & Co.	300. 600	P G ..	10 a.m. to 12 n. 4 to 6 p.m. 8 p.m. to 12 midnight	0 40	—	
Chinese Prince[1] ..	YJD	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40		
Chingford[1]	YGJ	115	James Mitchell & Sons	300, 600	P G ..	X	0.40	—	
Chinkoa[1]	MKO	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Chipana[1]	ZJE	—	New York & Pacific S.S. Co., Ltd.	300, 600	P G ..	X	—	—	
Chiria[2]	GUV	30	James Bird, London	300, 600	P ..	X	—	—	
Chiswick BNX[1] ..	BNX	140	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Chiverstone[1]	YYP	145	Guéret's Anglo-Brazilian Coaling Co., Ltd.	300, 600	P G ..	X	0.40	—	
Chupra[1]	GPU	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Chyebassa[1]	MYF	180	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Cid[1]	XJF	150	John Hall, jun.	300, 600	P G ..	X	0.40	—	
Cilurnum[1]	GCZM	135	Hall Bros.	—	—	—	—	—	
Cimbrier[1]	EON	140	Lloyd Royal Belge (Great Britain), Ltd.	300, 600	P G ..	X	0.40	—	
Circassia[1]	MWY	190	Henderson Bros.	300, 600	P G ..	X	0.40	—	
Circe Shell[1]	ZDC	185	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—	
Ciscar[1]	GCKB	—	MacAndrews & Co., Ltd. ..	—	—	—	—	—	
City[2]	BCD	150	Frew, Elder & Co...	300, 600	P G ..	X	0.40	—	
City of Agra[1]	MNZ	175	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Algiers[1] ..	MDU	—	Transport & Trading Co. ..	300, 600	P G ..	X	0.40	—	
City of Baroda[1] ..	EOE	170	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Belfast[2] .	BBJ	220	Midland Railway Co.	300, 600	P G ..	X	—	—	
City of Benares[1] ..	GCPJ	250	G. Smith & Sons	300, 600	P G ..	X	0.40	—	
City of Birmingham[1]	BDS	135	Ellerman Lines, Ltd.	300, 600	P G ..	X	0.40	—	
City of Bombay[1] ..	GUJ	160	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Bristol[1] ..	GCPF	150	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Cairo[1]	YYV	200	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Calcutta[1] ..	GCPK	200	W. S. Workman	300, 600	P G ..	N	0.40	—	
City of Canton[1] ..	YSM	180	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Chester[1] ..	MAG	150	G. Smith & Sons	300, 600	P G ..	X	0.40	—	
City of Colombo[1] ..	GYG	160	G. Smith & Sons	300, 600	P G ..	X	0.40	—	
City of Corinth[1] ..	XEX	135	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Delhi[1]	GIC	150	W. S. Workman	300, 600	P G ..	X	0.40	—	
City of Dunkirk[1] ..	GDD	180	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Durham[1] ..	GCPW	160	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Edinburgh[1] ..	GNC	190	G. Smith & Sons	300, 600	P G ..	X	0.40	—	
City of Exeter[1] ..	MSW	230	City Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Florence[1] ..	YYQ	145	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Hankow[1] ..	MUG	180	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Karachi[1] ..	GBW	200	G. Smith & Sons	300, 600	P G ..	X	0.40	—	
City of Lahore[1] ..	GCPS	200	Hall Line, Ltd.	300, 600	P G ..	N	0.40	—	
City of Lincoln[1] ..	GDP	150	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of London GCPX[1]	GCPX	140	Ellerman Lines, Ltd.	300, 600	P G ..	X	0.40	—	
City of Madras[1] ..	MCY	160	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Madrid[1] ..	MTM	160	W. S. Workman	300, 600	P G ..	X	0.40	—	
City of Manchester[1] ..	ZGG	170	W. S. Workman	300, 600	P G ..	X	0.40	—	
City of Manila[1] ..	ZHF	170	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	
City of Marseilles[1] ..	GCPY	250	G. Smith & Sons	300, 600	P G ..	N	0.40	—	
City of Melbourne[1] ..	GBPR	170	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
City of Naples[1]	GCPT	150	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Newcastle[1]	YYU	180	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Norwich[1]	GYA	170	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Oran[1]	YTB	170	W. S. Workman	300, **600**	P G	X	0.40	—	
City of Oxford	GBYR	—	Ellerman Lines, Ltd.	300, **600**	P G	X	0.40	—	
City of Poona[1]	GBB	230	G. Smith & Sons	300, **600**	P G	X	0.40	—	
City of Rangoon[1]	MTP	160	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Reims[1]	XEP	—	Olivier & Co., Ltd.	300, **600**	P G	X	0.40	—	
City of Shanghai[1]	EMM	180	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Smyrna[1]	EII	155	Transport & Trading Co., Ltd.	300, **600**	P G	X	0.40	—	
City of Sparta[1]	YUK	180	W. S. Workman	300, **600**	P G	X	0.40	—	
City of Versailles[1]	YNO	—	Transport & Trading Co., Ltd.	300, **600**	P G	X	0.40	—	
City of Vienna[1]	MSK	160	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
City of Winchester[1]	LUC	135	Hall Line, Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
City of York[1]	GAO	250	G. Smith & Sons	300, **600**	P G	X	0.40	—	
Clam[1]	YHZ	130	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Clan Alpine[1]	XJE	140	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Buchanan[1]	YVZ	145	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Chattan[1]	ZHS	135	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
ClanChisholm[1]	LSF	125	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Colquhoun[1]	YZA	145	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Clan Cumming[1] ..	YOH	150	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Graham[1] ..	YUL	190	Ministry of Shipping	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Keith[1]	BCU	150	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Kennedy[1] ..	EQI	150	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Kenneth[1] ..	YES	—	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Lamont[1]	YON	200	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Lindsay[1] ..	YOO	120	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan MacArthur[1] ..	YZS	170	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	
Clan Macaulay[1] ..	YJQ	125	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Macbean[1]	XJD	120	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	
Clan Macbeolan[1] ..	YGF	155	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	
Clan Macbeth[1] ..	YVV	200	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	
Clan Macbrayne[1] ..	YPS	160	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Clan Macbride[1]	ZHT	150	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macdonald[1]	ZHV	145	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macewen[2]	GVH	100	Cayzer, Irvine & Co., Ltd.	300, **600**	P	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macfadyen[1]	LSG	130	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macgillivray[2]	GVS	100	Cayzer, Irvine & Co., Ltd.	300, **600**	P	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macinnes[1]	GCTP	—	Cayzer, Irvine & Co., Ltd.	—	—	—	—	—	
Clan Macintosh[1]	ZGE	150	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macintyre[1]	MOC	—	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan MacKay	YTI	—	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	—	0.40	—	
Clan MacKellar[2]	GZM	100	Cayzer, Irvine & Co., Ltd.	300, **600**	P	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Mackenzie[1]	YXX	180	Cayzer, Irvine & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Clan Mackinlay[1] ..	YXC	135	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Mackinnon[1] ..	YOG	145	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Maclaren[1] ..	YJO	—	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macmaster[1] ..	ZXK	130	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macmillan[1] ..	XKV	140	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macphee[1] ..	ZCB	170	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macquarrie[2] ..	GVL	100	Cayzer, Irvine & Co., Ltd. ..	300, 600	P ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macrae[2]	GVM	100	Cayzer, Irvine & Co., Ltd. ..	300, 600	P ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macvicar[1] ..	XHB	120	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Macwilliam[1] ..	LTS	100	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Malcolm[1]	ZQK	140	Cayzer, Irvine & Co., Ltd ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Matheson[1] ..	MZQ	150	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Menzies[1] ..	LSH	—	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Clan Monroe [1] ..	EIS	140	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Morrison [1] ..	EIR	200	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Murdoch [1] ..	ZSA	160	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Murray [1]	LSR	110	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Ogilvy [2]	GVV	100	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40		
Clan Ranald [1]	EIT	140	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Robertson [1] ..	ZHU	150	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Ross [2]	GVU	100	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Clan Sinclair [1]	YZB	150	Cayzer, Irvine & Co., Ltd. ..	300, **600**	P ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Clan Skene[1]	BUK	100	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Stuart[1]	ZPN	145	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Sutherland[1] ..	YJP	120	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clan Urquhart[1] ..	YZG	190	Cayzer, Irvine & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Clare Hugo Stinnes I[1]	GBCZ	—	Bell, Symondson & Co.	300, 600	P G ..	X	0.40	—
Clarissa Radcliffe[1] ..	EWF	190	E. Thomas Radcliffe & Co. ..	300, 600	P G ..	X	0.40	—
Claro[1]	ODV	120	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.40	—
Classic[1]	ZCF	—	Belfast S.S. Co.	300, 600	P G ..	X	0.05	0.50
Claus Horn[1]	GCTK	—	Harris & Dixon, Ltd.	—	—	—	—	—
Claymont[1]	BAH	—	Elvidge & Morgan..	300, 600	P G ..	X	0.40	—
Clearpool[1]	LTI	130	Sir R. Ropner & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Clearton[1]	YGI	125	R. Chapman & Son	300, 600	P G ..	X	0.40	—
Clearway[1]	MYH	210	A. Yule & Co.	300, 600	P G ..	X	0.40	—
Clemenceau[1]	ZRH	120	London Transport Co.	300, 600	P G ..	X	0.40	—
Clifftower[1]	YMA	145	Hansen Bros., Ltd.	300, 600	P G ..	X	0.40	—
Cliftonhall[1]	EKV	110	Guthe Bros., Ltd...	300, 600	P G ..	X	0.40	—
Clintonia[1]	YHT	145	J. Robinson & Sons	300, 600	P G ..	X	0.40	—
Cloutsham[1]	ZIS	—	W. J. Tatem, Ltd.	300, 600	—	X	—	—
Clumberhall[1]	GXW	140	W. Hartlepool S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Cluny Castle[1]	GCRN	200	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—
Clutha[1]..	YVD	—	W. Robertson	300, 600	P G ..	X	0.40	—
Clydesdale BDF[1] ..	BDF	180	Leeds Fireclay Co., Ltd.	300, 600	P G ..	X	0.40	—
Coatsworth[1]	GCDB	175	R. S. Dalgliesh, Ltd.	—	—	—	—	—
Coconada[1]	GCRP	210	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Colaba[1]	GBT	175	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Colleen Bawn[3] ..	YWM	110	Lan. & Yorks. Rly. Co.	300, 600	P G ..	N	0.05	0.50
Collingham[1]	EJZ	—	Pentwyn S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Colon[1]	GCKD	120	MacAndrews & Co., Ltd. ..	300, 600	P G ..	X	—	—
Colonia BBS[1]	BBS	—	Shipping Controller	300, 600	P G ..	X	0.40	—
Colonia MCL[3]	MCL	140	F. R. Lucas	300, 600	P ..	—	—	—
Colonial[1]	YSY	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Columbia MOI[1] ..	MOI	230	Henderson Bros.	300, 600	P G ..	N	0.40	—
Comanchee[1]	GCRQ	140	J. Hamilton	300, 600	P G ..	X	0.40	—
Comeric GBTD[1] ..	GBTD	160	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Comic[1]	LSK	110	Belfast S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Comino[1]	BTD	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Commonwealth[1] ..	GCRS	170	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Competitor[1]	YQJ	135	Leeston Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Comrie Castle[1] ..	GCRT	200	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—
Concordia[1]	ELI	190	Donaldson Bros., Ltd.	300, 600	P G ..	X	0.40	—
Confield[1]	XEU	120	E. J. Sutton & Co.	300, 600	P G ..	X	0.40	—
Conqueror	GID	150	Duke of Manchester	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Conway[1]	ZHM	180	Royal Mail S.P. Co., Ltd.	300, **600**	P G	X	0.40	—	
Cooee[1]	CGM	—	Australian Commonwealth	—	—	—	—	—	
Cooeyanna[1]	GBV	170	British India S.N. Co. Ltd.	300, **600**	P G	X	0.40	—	
Copenhagen[1]	EXS	140	Glen & Co.	300, **600**	P G	X	0.40	—	
Coquetmede[1]	BDE	—	D. & T. G. Adams	300, **600**	P G	X	0.40	—	
Corby[1]	BDD	145	Merritt & Robson	300, **600**	P G	X	0.40	—	
Corcovado MIE[1]	MIE	210	Pacific S.N. Co.	300, **600**	P G	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—	
Corcrest[1]	BBV	130	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Cordelia MXM[1]	MXM	170	C.T. Bowring & Co., Ltd.	300, **600**	P M	X	0.40	—	
Cordoba[1]	GBCR	—	Orient S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Corfe Castle[1]	ERE	—	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Corinthic[1]	MWT	230	White Star Line	300, **600**	P G	X	0.40	—	
Cormorant MFJ[3]	MFJ	140	Western Telegraph Co.	300, **600**	P	—	—	—	
Cormorant BTZ[1]	BTZ	110	Cork S.S. Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Cornish City[1]	YHR	150	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Cornishman[1]	GDW	230	British & N. Atlantic S.N.Co., Ltd.	300, **600**	P G	X	0.40	—	
Cornish Point[1]	ZPE	180	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Coronado GBC[1]	GBC	190	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40	—	
Corsican[1]	MCN	240	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	N	0.40	—	
Corstar[1]	EXT	100	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Cortes[1]	GBXD	—	MacAndrews & Co., Ltd.	—	—	—	—	—	
Corton[1]	BMO	145	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Corwen[1]	EVJ	100	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Cosmos[1]	LTD	150	J. S. Ambrose	300, **600**	P G	X	0.40	—	
Cosmos Don[1]	ZZX	145	W. J. Williams	300, **600**	P G	X	0.40	—	
Cosmos Volga[1]	ZRU	150	O. & W. Williams & Co.	300, **600**	P G	X	0.40	—	
Cottesmore[1]	EPW	—	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
County of Cardigan[1]	ETP	150	D. Owen	300, **600**	P G	X	0.40	—	
County of Carmarthen[1]	YVN	100	D. Owen	300, **600**	P G	X	0.40	—	
Courtfield[1]	YCH	200	Fothergill & Nelson	300, **600**	P G	N	0.40	—	
Courtown[1]	LUS	115	Harrison, Sons & Co.	300, **600**	P G	X	0.40	—	
Cove[1]	ZEC	—	Cory Colliers, Ltd.	300, **600**	P G	X	0.40	—	
Cowrie[1]	ZMW	175	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	

Coya[1]	GXH	180	New York & Pacific S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Cramond[1]	GBNQ	170	W. Thomson & Co.	300, 600	P G	X	—	—
Crane YDP[2]	YDP	—	General S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Cranfield[1]	GBQS	—	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Cranley[1]	YSP	175	Donaldson Bros., Ltd.	300, 600	P G	X	0.40	—
Cranmore[1]	EVK	170	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Craonne ZWW[1]	ZWW	170	Leopold Walford, London, Ltd.	300, 600	P G	X	0.40	—
Crenella[1]	YPK	170	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Cressington Court[1]	EJH	160	A. M. Sutherland	300, 600	P G	X	0.40	—
Cretic[1]	MRC	170	White Star Line	300, 600	P G	N	0.40	—
Crewe Hall[1]	EIJ	150	Hall Line, Ltd.	300, 600	P G	X	0.40	—
Croft	BIT	—	Blyth Harbour Commissioners	300, 600	P G	X	—	—
Cromarty[1]	ZTX	—	A. M. Sutherland & Co., Ltd.	300, 600	P G	X	0.40	—
Cromer[3]	ZOB	—	Great Eastern Railway Co.	300, 600	P G	N	0.05	0.50
Cronstadt[1]	BUE	145	W. Thomson & Co.	300, 600	P G	X	0.40	—
Crosby Hall[1]	EIK	125	Hall Lines, Ltd.	300, 600	P G	X	0.40	—
Crosshill[1]	BEU	180	Macbeth & Co., Ltd.	300, 600	P G	X	0.40	—
Crostafels[1]	GBDX	—	Harris & Dixon, Ltd.	300, 600	P G	X	0.40	—
Crown of Cadiz[1]	ZLA	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Castile[1]	EYK	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Cordova[1]	ZWD	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Galicia[1]	EYL	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Granada[1]	BCH	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Navarre[1]	BCG	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Seville[1]	MTL	170	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Crown of Toledo[1]	MHV	180	Prentice Service & Henderson	300, 600	P G	X	0.40	—
Cufic[1]	GDR	180	White Star Line	300, 600	P G	X	0.10	—
Culna[1]	GOQ	190	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Cundall[1]	OEB	120	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Curaca[1]	YKA	200	New York & Pacific S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Curraghmore[2]	GCLR	150	L. & N.W. Railway	300, 600	P G	X	—	—
Custodian[1]	GCE	220	T. & J. Harrison	300, 600	P G	X	0.40	—
Cutcombe[1]	ZLS	—	Maritime Shipping & Trading Co.	300, 600	P G	X	0.40	—
Cuthbert[1]	YPR	155	Booth S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Cyclops GTF[1]	GTF	90	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Cymric Pride	BJQ	145	Anglo-Belgique Shipping Co., Ltd.	300, 600	P G	X	0.40	—
Cymric Vale[1]	LUG	145	Owen & Williams & Sons	300, 600	P G	X	0.40	—
Cypria	ZZL	180	Cunard S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Cyprian Prince[1]	GCMT	170	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Cyrena[1]	ZAW	—	Anglo-Saxon Petro. Co., Ltd.	—	—	—	—	—
Czar[1]	ZFS	220	Cunard S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Czaritza[1]	ZFY	220	Cunard S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Dacre Castle[1]	MTQ	150	J. Chambers & Co.	300, 600	P G	X	0.40	—
Dagenham[1]	GCDQ	110	J. Hudson & Co., Ltd.	300, 600	P G	X	0.05	0.50
Daghestan[1]	YLL	145	Fisher Alimonda & Co.	300, 600	P G	X	0.40	—
Dago[1]	ODW	—	Ellerman's Wilson Line, Ltd.	300, 600	P G	X	0.40	—
Dalemoor[1]	YIF	145	W. Runciman & Co.	300, 600	P G	X	0.40	—
Dallington[1]	ODE	115	Bell Symondson & Co.	300, 600	P G	X	0.40	—
Dania, GBTK[1]	GBTK	—	A. Holt & Co.	300, 600	P G	X	0.40	—
Danier[1]	GCNZ	—	Lloyd Royal Belge (Great Britain), Ltd.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Danube MBM[1]	MBM	230	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Darino[1]	BOS	100	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Darnholme[1]	YLD	150	Wade & Christie	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Darro[1]	GCRV	260	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Datchet[1]	EWH	140	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
David Lloyd George[1]	EOS	200	Williams & Mordey	300, **600**	P G	X	0.40	—	
Dean Swift[3]	EIV	—	General S.N. Co., Ltd.	300, **600**	P G	X	—	—	
Deerwood[1]	XIK	120	W. France, Fenwick & Co., Ltd.	300, **600**	P G	X	0.40	—	
Defender[1]	YTE	230	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Delambre[1]	BHC	190	Lamport & Holt	300, **600**	P G	X	0.40	—	
Delaware GCRW[1]	GCRW	200	J. Hamilton	300, **600**	P G	X	0.40	—	
Delmira[1]	ZYS	140	Alex. Bicket	300, **600**	P G	X	0.40	—	
Delphinula[1]	MXR	170	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Delta GBJT[1]	GBJT	145	J. & A. Roxburgh	300, **600**	P G	X	0.40	—	
Delta MKG[1]	MKG	240	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Demerara[1]	GCRZ	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Demodocus[1]	ZKH	180	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Demosthenes[1]	MGK	230	G. Thompson & Co., Ltd.	300, **600**	P G	X	0.40	—	
Denis[1]	MDE	170	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Denpark[1]	XJA	140	J. & J. Denholm	300, **600**	P G	X	0.40	—	
Derbyshire[1]	MYB	200	Bibby Bros. & Co.	300, **600**	P G	X	0.40	—	
Derindje[1]	GBKC	—	Hall Bros.	300, **600**	P G	X	0.40	—	
Derwent River[1]	ZEF	170	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Deseado[1]	GCRX	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Desna[1]	GCRY	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Dessau[1]	GBNR	—	Gow, Harrison & Co.	300, **600**	P G	X	0.40	—	
Deucalion[1]	YOW	210	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Devanha[1]	MOU	180	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Devon[1]	ZBJ	180	Federal S.N. Co., Ltd.	300, **600**	P G	8 a.m. to 12 n. 2 to 3 p.m. 6 p.m. to 12 (midnight)	0.40	—	
Devona[1]	GRD	150	Steamship Convoy Co.	300, **600**	P G	X	0.40	—	
Devon City[1]	ESD	150	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Dewsbury[3]	BEQ	—	Great Central Railway	300, **600**	P G	X	—	—	

Dible Bridge[1]	ZHJ	155	Hessler & Co.	300, 600	P G ..	X	0.40	—
Dictator[1]	BDH	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Dieppe[8]	MRL	90	L. B. & S.C. Railway Co. ..	300, 600	P G ..	N	0.15	1.50
Digby[1]	MNG	190	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Dilwara[1]	GCF	200	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Director[1]	ETB	180	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Dirk	BGB	—	David MacBrayne, Ltd.	—	—	—	—	—
Discoverer[1]	EIF	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Diyatalawa[1]	ESZ	—	Grahams & Co.	300, 600	P G ..	X	0.40	—
Djerissa[1]	GZC	100	F. C. Strick & Co., Ltd.	300, 600	P G ..	X	0.40	—
Dockleaf[1]	EZK	190	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Dogra[1]	BPB	—	Asiatic S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Dolphin Shell[1]	ZEP	200	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Domingo de Larrinaga[1]	ZJC	170	Larrinaga & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Dominic[1]	ZKQ	180	Booth S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Dominion MDF[1] ..	MDF	260	British & North Atlantic S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Domira[1]	YJR	140	J. & T. Harrison	300, 600	P G ..	X	0.40	—
Donax[1]	ZNL	185	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Dongarra	VJW	—	Australian Commonwealth ..	—	—	—	—	—
Dongola[1]	MNH	240	P. & O. S.N. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Doonholm[1]	ZXM	130	J. Edgar & Co.	300, 600	P G ..	X	0.40	—
Dora[1]	GBWJ	—	C. Doresa & Co.	—	—	—	—	—
Dorie[1]	LSX	150	Burdick & Cook	300, 600	P G ..	X	0.40	—
Dorington Court[1] ..	MWR	170	Haldin & Co., Ltd.	300, 600	P G ..	X	0.40	—
Dorset[8]	GRY	320	Potter, Trinder & Gwyn	300, 450, 600	P G ..	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Dotterel[1]	ZRC	—	Cork S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Douro ODJ[1]	ODJ	135	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.40	—
Dromore Castle[1] ..	YAD	—	Union Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—
Dromana	VXP	—	Commonwealth Government Line	—	—	—	—	—
Dryden[1]	ZHW	—	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Duchess of Devonshire[8]	GPP	150	Midland Railway Co.	300, 400, 600	P G ..	N	0.05	—
Duendes[1]	GCSP	250	Pacific S.N. Co., Ltd.	300, 600	P G ..	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—
Duffield[1]	ZQJ	150	Hunting & Son	300, 600	P G ..	X	0.40	—
Duke of Argyll[8] ..	YWK	110	Lan. & Yorks & L.&N.W. Railway Cos.	300, 600	P G ..	N	0.05	0.50
Duke of Clarence[8] ..	YWL	130	Lancs & Yorks. Railway Co. ..	300, 600	P G ..	N	0.05	0.50
Duke of Connaught[8] ..	YWI	110	Lan. & Yorks. & L.&N.W. Railway Cos.	300, 600	P G ..	N	0.05	0.50
Duke of Cornwall[1] ..	XFG	120	R. B. Chellew	300, 600	P G ..	X	0.40	—
Duke of Cumberland[8]	YWJ	110	Lan. & Yorks. & L.&N.W. Railway Cos.	300, 600	P G ..	N	0.05	0.50
Dumfries[1]	BFA	150	A. M. Sutherland	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Dumra[1]	XGC	160	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Danaff Head[1]	YAQ	150	G. Heyn & Sons	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Dunbridge[1]	OCG	180	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—	
Duncluthа[1]	EZA	—	Glen & Co.	300, **600**	P G	X	0.40	—	
Dundrennan[1]	EJI	—	Glen & Co.	300, **600**	P G	X	0.40	—	
Dundrum Castle[1]	YAX	—	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Dunera[1]	GCU	230	British India S.N. Co., Ltd.	300, **600**	P G	X	—	—	
Duneric[1]	EXG	125	Henry Johnson, Sons & Co., Ltd.	300, **600**	P G	X	0.40	—	
Dungeness[1]	ELQ	150	Litricheux & David, Ltd.	300, **600**	P G	X	0.40	—	
Dunmail[1]	GBSZ	170	Sharp & Co.	300, **600**	P G	X	0.40	—	
Dunluce Castle[1]	MQO	250	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Dunolly[1]	BNW	115	Glen & Co.	300, **600**	P G	X	0.40	—	
Dunrobin[1]	GVQ	170	A. M. Sutherland	300, **600**	P G	X	0.40	—	
Dunstan[1]	ZLE	170	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Dunvegan Castle[1]	MPQ	270	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Duquessa[1]	ZQC	120	Furness Houlder Argentine Lines, Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Durham GQC[1]	GQC	300	Federal S.N. Co., Ltd.	300, **600**	P G	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—	
Durham Castle[1]	MQN	220	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Earlswood[1]	YDD	125	Aster Shipping Co., Ltd.	300, **600**	P G	X	—	—	
Easterly[1]	GCKN	—	Fratres, Ltd.	—	—	—	—	—	
Eastern[2]	YUH	250	Eastern & Australian S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Eastern City[1]	YGZ	145	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Eastgate[1]	BFH	135	Turnbull, Scott & Co.	300, **600**	P G	X	0.40	—	
Eastlands[1]	YEO	160	J. F. Wilson & Co.	300, **600**	P G	X	0.40	—	
Eastwood[1]	ZWN	160	Macbeth & Co., Ltd.	300, **600**	P G	X	0.40	—	
Eaton Hall[1]	EZY	120	Hanson Bros., Ltd.	300, **600**	P G	X	0.40	—	
Ebani[1]	ZCG	180	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Eboe[1]	ZTE	200	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	

Ebro[1]	MTJ	230	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Eburna[1]	ZMV	167	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Edendale[1]	OFP	120	Weardale S.S. Co., Ltd.	300, 600	P G	X	0.15	1.50
Eden Hall[1]	ZRF	140	Westcott & Lawrence Line, Ltd.	300, 600	P G	X	0.40	—
Edinburgh Castle[1]	MQE	230	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Edith Cavell[1]	YCM	180	H. E. Moss & Co.	300, 600	P G	X	0.40	—
Edmonton[1]	XHG	—	Canada S.S. Lines, Ltd.	300, 600	P G	X	0.40	—
Edmund Hugo Stinnes[1]	GBVR	—	Burnett & Cook & Co.	—	—	—	—	—
Eduard Woermann[1]	GBDR	—	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Egba[1]	GRO	220	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Eggesford[1]	YXJ	170	Mediterranean Cargo Steamers, Ltd.	300, 600	P G	X	0.40	—
Egori[1]	YVH	170	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Egra[1]	GCSF	190	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Egremont Castle[1]	YZT	145	J. Chambers & Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Egwanga[1]	YMM	170	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Egypt[1]	MMG	250	P. & O. S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Egyptian Transport[1]	ZDW	140	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Ehrenfels[1]	GBJS	—	J. & A. Roxburgh	300, 600	P G	X	—	—
Eichsfeld[1]	GBLY	—	Glover Bros.	300, 600	P G	X	0.40	—
Elder ZSL[1]	ZSL	140	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Eileen	GAN	200	S. B. Joel	300, 600	P G	X	0.40	—
Ekaterinoslav[1]	ZLJ	200	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Ekma[1]	GCSJ	190	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Elbe[1]	GBLP	—	Gordon S.S. Co., Ltd.	300, 600	P G	X	—	—
Elbing[1]	GBXL	—	W. Runciman & Co.	—	—	—	—	—
El Cordobes[1]	MHO	250	British & Argentine S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Elder Branch[1]	YFT	170	F. & W. Ritson	300, 600	P G	X	0.40	—
Electra[3]	MEE	140	Eastern Telegraph Co., Ltd.	300, 450, 600	P	—	0.40	—
Electrician[1]	YHO	170	T. & J. Harrison	300, 600	P G	X	0.40	—
Elephanta[1]	GCSK	200	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Elgin[1]	BJW	145	A. M. Sutherland	300, 600	P G	X	0.40	—
Ellaline[1]	BKB	—	Mordey, Jones & Co.	300, 600	P G	X	—	—
Ellawood[1]	GCZY	—	J. MacElvie	—	—	—	—	—
Ellenga[1]	GCSL	230	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Ellerdale[1]	YVL	145	Common Bros.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	—	—
Elleric[1]	BFJ	145	J. Crass & Co.	300, 600	P G	X	0.40	—
El Lobo[1]	YVB	—	C. T. Bowring, Ltd.	300, 600	P G	X	0.40	—
Ellora[1]	GCSM	230	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Elm Branch[1]	YNS	150	F. & W. Ritson	300, 600	P G	X	0.40	—
Elmina[1]	MZI	190	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Elmleaf[1]	EZF	190	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Elmtree[1]	GBWK	—	The Maindy Shipping Co., Ltd.	—	—	—	—	—
El Paraguayo[1]	GCSP	—	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Elpenor[1]	ZKD	250	A. Holt & Co.	300, 600	P G	X	0.40	—
Elswick Grange[1]	GBF	155	Weidner, Hopkins & Co.	300, 600	P G	X	0.40	—
Elswick Hall[1]	MYD	—	Weidner, Hopkins & Co.	300, 600	P G	X	—	—
Elswick House[1]	ZHX	135	Weidner, Hopkins & Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Elswick Tower [1]	BEF	125	Weidner, Hopkins & Co.	300, **600**	P G	X	0.40	—	
El Uruguayo [1]	GCSQ	250	British & Argentine S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Elveric [1]	MBX	150	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Elwick [1]	MYJ	150	Sharp & Co.	300, **600**	P G	X	0.40	—	
Elysia [1]	MRH	180	Henderson Bros.	300, **600**	P G	X	0.40	—	
Elzasier [1]	BQQ	150	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	0.40	—	
Emerald [1]	GBNK	—	Sir A. Du Cros, Bart., M.P.	300, **600**	P G	X	0.40	—	
Empire YUI [1]	YUI	250	R. L. Connell & A. Bicket	300, **600**	P G	X	0.40	—	
Empress [3]	GUI	50	S.E. & C. Railway Co.'s Mang. Com.	300, **600**	P G	N	0.15	1.50	
Empress of Britain [1]	MPB	190	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	N	0.40	—	
Empress of France [1]	GYH	250	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	X	0.40	—	
Enfield [1]	YKE	100	S. Marshall & Co.	300, **600**	P G	X	0.40	—	
Engadine [3]	GUK	50	S.E. & C. Railway Co.'s Mang. Com.	300, **600**	P G	N	0.15	1.50	
Engineer [1]	MFO	170	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Ennisbrook [1]	BKG	190	Miller & Richards, Ltd.	300, **600**	P G	X	0.40	—	
E. O. Saltmarsh [1]	EPA	130	S. M. Thompson	300, **600**	P G	X	0.40	—	
Epsom [1]	ERH	—	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Erfurt [1]	GBMS	—	Lawther, Latta & Co.	300, **600**	P G	X	—	—	
Eric Calvert [1]	XEK	125	A. Calvert Shipping Co.	300, **600**	P G	X	0.40	—	
Eric Petersen [1]	GBXN	—	R. Mackill & Co.	—	—	—	—	—	
Ericus [1]	GVK	110	Ohlson & Co.	300, **600**	P G	X	0.40	—	
Erika	GBYF	—	Furness, Withy & Co., Ltd.	—	—	—	—	—	
Erinier [1]	YYX	—	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	—	—	
Erinpura [1]	MVJ	210	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Erlesburgh [1]	GCRD	155	Headlam & Rowland	300, **600**	P G	X	0.40	—	
Ernemore [1]	OCJ	150	Johnston Line, Ltd.	300, **600**	P G	X	0.40	—	
Eros BTK [1]	BTK	120	L. Wright & Co.	300, **600**	P G	X	—	—	
Erroll [1]	ERZ	—	Australind S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Escalona [1]	GPZ	170	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Eskbridge [1]	YKG	135	Crossby, Magie & Co.	300, **600**	P G	X	0.40	—	
Eskwood [1]	GCTY	—	E. Johnson & Co., Ltd.	—	—	—	—	—	

Esperanza de Larrinaga[1]	EMC	170	Larrinaga & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Essequibo[1]	MTK	230	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Essex GXE[3]	GXE	300	Federal S.N. Co., Ltd.	300, 600	P G ..	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Esturia[1]	BRG	120	British Burma Petro. Co., Ltd. ..	300, 600	P G ..	X	—	—
Etha Rickmers[1] ..	GBTF	—	Turner Brightman & Co. ..	300, 600	P G ..	X	0.40	—
Ethelaida[1]	ZSI	—	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	—	—
Ethelaric[1]	LUM	170	Robt. Harrowing & Co.	300, 600	P G ..	X	0.40	—
Ethelfreda[1]	GVX	—	Robt. Harrowing & Co.	300, 600	P G ..	X	0.40	—
Ethelhilda[1]	XED	145	Edward Sons & Co.	300, 600	P G ..	X	0.40	—
Ethelstan[1]	YIU	140	J. A. Thompson & Co.	300, 600	P G ..	X	0.40	—
Ethelwolf[1]	LUL	140	Robt. Harrowing & Co.	300, 600	P G ..	X	0.40	—
Ethelwynne[1]	BOM	145	J. Constantine & Son	300, 600	P G ..	X	0.40	—
Euclid[1]	ZQG	180	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Euplectela[1]	EVV	—	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Euripides[1]	MSE	240	G. Thompson & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Euryades[1]	YRG	190	A. Holt & Co.	300, 600	P ..	X	0.40	—
Euryalus GCZ[1] ..	GCZ	180	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Eurybates[1]	YRH	180	A. Holt & Co.	300, 600	P ..	X	0.40	—
Eurydamas[1]	YQU	170	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Eurylocus[1]	YRI	200	A. Holt & Co.	300, 600	P ..	X	0.40	—
Eurymachus[1]	YQZ	—	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Eurymedon[1]	YRA	170	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Eurypylus[1]	YRJ	230	A. Holt & Co.	300, 600	P ..	X	0.40	—
Euterpe[1]	BFG	170	Sundon Shipping Co.	300, 600	P G ..	X	0.40	—
Everilda[1]	ZYC	145	Fisher Renwick & Co.	300, 600	P G ..	X	0.40	—
Exeter City[1]	BQW	130	C. Hill & Sons	300, 600	P G ..	X	0.40	—
Exmouth[1]	EOO	145	Anning Bros.	300, 600	P G ..	X	0.40	—
Exmouth II.[3]	GYF	150	Mngrs. of Metrop. Asylum District	300, 600	P ..	X	0.40	—
Explorer MVV[1] ..	MVV	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
F. A. Tamplin[1] ..	ZLX	135	Meade, King, Robinson & Co. ..	300, 600	P G ..	X	0.40	—
Fabian[1]	GBWS	140	Ellerman Lines, Ltd.	300, 600	P G ..	X	0.40	—
Falernian[1]	EMK	150	Graham, Smith	300, 600	P G ..	X	0.40	—
Falkenfels[1]	GBCF	—	J. Chambers & Co.	300, 600	P G ..	X	0.40	—
Falls City[1]	ZNR	130	W. R. Smith & Sons	300, 600	P G ..	X	0.40	—
Fanad Head[1]	YXF	150	G. Heyn & Sons	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Faraday[3]	GTP	290	Siemens Bros. & Co., Ltd. ..	300, 450, 600	P G ..	X	0.40	
Farnworth[1]	ZXI	190	R. S. Dalgliesh	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Fastness[1]	YFZ	—	Marshal Shipping Co.	300, 600	P G ..	X	0.40	—
Felixstowe[3]	BER	—	Great Eastern Railway Co. ..	300, 600	P G ..	X	0.05	0.50
Fenchurch[1]	ENX	250	Tapp, Hatch & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Fennia[1]	YKO	—	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Fernandina OEG[1] ..	OEG	115	Furness, Withy & Co., Ltd. .	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Fernfield[1]	OCF	145	Woods, Taylor & Brown	300, **600**	P G ..	X	0.40	—	
Ferngarth[1]	YKR	140	Barr, Crombie & Co.	300, **600**	P G ..	X	0.40	—	
Fernleaf[1]	EZE	170	British Tanker Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Fieldmarshal[1]	ZWQ	—	Union-Castle Mail S.S. Co., Ltd...	300, **600**	P G ..	X	—	—	
Fife[1]	EKG	145	A. M. Sutherland	300, **600**	P G ..	X	0.40	—	
Figuig ZLV[11]	ZLV	—	Red Funnel Shipping Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Filey[1]	MGY	130	Moller & Co.	300, **600**	P G ..	X	0.40	—	
Finchley[1]	YIX	135	Watts, Watts & Co., Ltd. ..	300, **600**	P G ..	X	—	—	
Firtree[1]	XIG	120	Maindy Shipping Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Fishpool[1]	ZWL	150	Sir R. Ropner & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Flaminian[1]	YLY	150	Ellerman Lines, Ltd.	300, **600**	P G ..	X	0.40	—	
Flamma[1]	OFR	—	Stephenson Clarke & Co. ..	300, **600**	P G ..	X	0.05	0.50	
Flandrier[1]	MSX	125	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G ..	X	0.40	—	
Flixton[1]	ELU	—	R. A. McClelland	300, **600**	P G ..	X	0.40	—	
Flying Breeze	EPD	—	Alexandra Towing Co., Ltd. ..	300, **600**	—	X	—	—	
Foreric[1]	BMV	—	J. Langdon Rees, Ltd.	300, **600**	P G ..	X	0.40	—	
Forfar[1]	GCLK	—	B. J. Sutherland & Co., Ltd. ..	—	—	—	—	—	
Forst[1]	GBYC	—	G. Dodd & Co.	—	—	—	—	—	
Fort Victoria[1] ..	GCTN	—	Furness, Withy & Co., Ltd. ..	—	—	—	—	—	
Fotinia[1]	ZXS	—	Fisher, Alimonda & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Foyle ZUR[1]	ZUR	150	E. Hain & Son	300, **600**	P G ..	X	0.40	—	
Framlington Court[1] ..	ERV	135	Haldin & Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Francis[1]	MDG	170	Booth S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Francis Batey	GZI	—	J. Batey & Son, Ltd.	300, **600**	P G ..	X	—	—	
Francisco[1]	GCSW	250	Ellerman's Wilson Line, Ltd. ..	300, **600**	P G ..	8 a.m. to 1 p.m. 2 to 5 p.m. 6 to 10 p.m.	0.40	—	
Frankburn[1]	YDX	—	Macvicar Marshall & Co., Ltd. ..	300, **600**	P G ..	X	—	—	
Frankby[1]	BEA	—	Macvicar Marshall & Co., Ltd. ..	300, **600**	P G ..	X	—	—	
Frankdale[1]	GBPK	135	Macvicar Marshall & Co., Ltd. ..	300, **600**	P G ..	X	—	—	

Frankenfels[1]	BRI	—	Grahams & Co.	300, 600	P G	X	—	—	
Frankfurt[1]	GBJF	—	White Star Line	300, 600	P G	X	0.40	—	
Frankier[1]	YHF	145	Lloyd Royal Belge (Great Britain), Ltd.	300, 600	P G	X	0.40	—	
Frankinver[1]	BOF	—	Macvicar Marshall & Co., Ltd.	300, 600	P G	X	—	—	
Frankmere[1]	ZAD	250	Macvicar Marshall & Co., Ltd.	300, 600	—	X	—	—	
Frank Parish[1]	MUL	120	A. Holland & Co.	300, 600	P G	X	0.40	—	
Franktor[1]	YGD	120	Macvicar Marshall & Co., Ltd.	300, 600	P G	X	—	—	
Franziska	GBLD	—	Houlder, Middleton & Co., Ltd.	300, 600	P G	X	—	—	
Franz Wilke[1]	GBRM	—	W. Runciman & Co., Ltd.	300, 600	P G	X	0.40	—	
Fraser River[1]	ZEG	150	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—	
Freiberg[1]	GCSD	—	British India S.N. Co., Ltd.	—	—	—	—	—	
Freienfels[1]	ZPJ	—	Grahams & Co.	300, 600	—	X	—	—	
Friedrichsruhe[1]	GBKM	—	Orient S.N. Co., Ltd.	—	—	—	—	—	
Freshwater[1]	ETS	170	H. E. Moss & Co.	300, 600	P G	X	0.40	—	
Fritz	GCVK	—	Glen Line, Ltd.	—	—	—	—	—	
Frontenac[1]	XVY	—	—	—	—	—	—	—	
Fullerton[2]	BKZ	—	Denaby & Cadeby Main Collieries, Ltd.	300, 600	P G	X	—	—	
Fulmar[1]	GBNW	130	Cork S.S. Co., Ltd.	300, 600	P G	X	0.05	0.50	
Fultala[2]	GDC	210	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—	
Furst Bulow[1]	GBCX	—	Lawther Latta & Co.	300, 600	P G	X	—	—	
Gaboon[1]	ZMK	170	Elder Dempster & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Gaelic Prince[1]	XIW	160	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Galka[2]	MQU	230	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—	
Gairsoppa[1]	GCZB	180	British India S.N. Co., Ltd.	—	—	—	—	—	
Galileo[1]	GII	200	Ellerman's Wilson Lines, Ltd.	300, 600	P G	8 a.m. to 1 p.m. 2 to 5 p.m. 6 to 10 p.m.	0.40	—	
Gallic[1]	MVO	150	Oceanic S.N. Co.	300, 600	P G	X	0.40	—	
Gallipoli GBFS[1]	GBFS	—	Rankin Gilmour & Co., Ltd.	300, 600	P G	X	0.40	—	
Galtee More[2]	GUU	250	L.&N.W. Railway Co.	300, 600	P G	N	0.50	0.50	
Galtymore[1]	GBNV	180	Furness, Withy & Co., Ltd.	300, 600	P G	X	—	—	
Gambhira[1]	GCQY	150	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—	
Gambia[2]	ESH	170	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—	
Gambia River[1]	ZEH	150	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—	
Gandara[1]	GCMR	170	British India S.N. Co., Ltd.	—	—	—	—	—	
Ganelon[1]	GBRP	—	R. S. Dalgliesh	300, 600	P G	X	0.40	—	
Ganges GWJ[2]	GWJ	115	James Nourse, Ltd.	300, 600	P G	X	0.40	—	
Garada[1]	GCMS	180	British India S.N. Co., Ltd.	—	—	—	—	—	
Gardenia[1]	BFO	135	J. Robinson & Sons	300, 600	P G	X	0.40	—	
Garryvale[1]	ELH	180	Dawson Bros. & Rowan	300, 600	P G	X	0.40	—	
Garth Castle[1]	MQP	250	Union-Castle Mail S.S. Co., Ltd	300, 600	P G	N	0.40	—	
Gascon[1]	MQV	220	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—	
Gasconier[1]	OEU	120	Lloyd Royal Belge (Great Britain), Ltd.	300, 600	P G	X	0.40	—	
Geddington Court[1]	EUN	—	Haldin & Co., Ltd.	300, 600	P G	X	0.40	—	
General Allenby[1]	ZZB	—	S. R. Sequerra	300, 600	P G	X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
General Church [1]	BOL	130	Byron S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
General William [1]	XWC	—	—	—	—	—	—	—	
Genesee ZES	ZES	—	Admiralty Coasting Trading Office	—	—	—	—	—	
Genesee MIT [1]	MIT	135	Anglo-American Oil Co.	300, **600**	P G	X	0.40	—	
George V	BIS	—	R. Redhead & Son, Ltd.	300, **600**	P G	X	0.40	—	
Gera [1]	GBLN	—	Phillipps, Phillipps & Co., Ltd.	300, **600**	P G	X	—	—	
Gerent [1]	XEQ	145	J. Westoll	300, **600**	P G	X	0.40	—	
Gerfreid [1]	GBMF	—	C. T. Bowring & Co.	300, **600**	P G	X	0.40	—	
Gertrud [1]	GBDV	—	Gellatly Hankey & Co.	300, **600**	P G	X	—	—	
Gharinda [1]	GCDP	—	British India S.N. Co., Ltd.	—	—	—	—	—	
Gibel Yedid [1]	BRS	—	H. M. Bland	300, **600**	P G	X	0.40	—	
Giessen	GBFK	—	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Gileston [1]	XIJ	140	Evan Thomas Radcliffe & Co.	300, **600**	P G	X	0.40	—	
Gilgai	VJK	—	Australian Commonwealth	—	—	—	—	—	
Gladiator [1]	YER	160	T. & J. Harrison	300, **600**	P G	X	—	—	
Gladstone	EOA	—	Alexandra Towing Co., Ltd.	300, **600**	P G	X	—	—	
Glamorgan [1]	BFP	150	Wigan S.S. Co.	300, **600**	P G	X	0.40	—	
Glamorganshire [1]	BHI	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Glasgow EJQ [1]	EJQ	130	Rankine Line, Ltd.	300, **600**	P G	—	0.05	0.50	
Glassford [1]	GDCF	—	Mann, McNeal & Co., Ltd.	300, **600**	P G	X	0.40	—	
Glastonbury [1]	BAI	180	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Glenade [1]	GBQC	190	Glen Line Ltd. (Macgregor Gow & Co., Ltd.)	300, **600**	P G	X	0.40	—	
Glenaffric [1]	BDC	160	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Glenamoy [1]	ZLP	170	Glen Line (Macgregor Gow & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Glenapp [1]	XKF	155	Glen Line (Macgregor Gow & Co., Ltd.)	300, **600**	P G	X	0.40	—	
Glenariffe [1]	GCLM	—	Glen Line (Macgregor Gow & Co., Ltd.)	—	—	—	—	—	
Glenavy [1]	ZLB	155	Glen Line (Macgregor Gow & Co., Ltd.)	300, **600**	P G	X	0.40	—	
Glenbridge [1]	GWX	145	Leeston Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Glendevon [1]	YRT	145	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Glendhu [1]	MXJ	160	Furness, Withy & Co. Ltd.	300, **600**	P G	X	—	—	
Glenearn [1]	GBTS	—	R. J. Thomas & Co., Ltd.	—	—	—	0.40	—	

Gleneden[1]	ENR	110	J. Napier	300, 600	P G ..	X	0.40	—
Glenelg[1]	ZIK	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Glenetive[1]	MEZ	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Glenfinlas[1]	BFX	140	Easton, Greig & Co.	300, 600	P G ..	X	0.40	—
Glengorm Castle[1] ..	MQS	200	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Glengyle[1]	ZKW	210	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	N	0.40	—
Glen Head[1]	ODA	150	G. Heyn & Sons	300, 600	P G ..	X	0.40	—
Gleniffer[1]	MUE	180	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Glenlochy[1]	GWN	120	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P ..	X	—	—
Glenlyon ZOX[1] ..	ZOX	175	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Glenmorag[1]	YEP	135	Easton, Greig & Co.	300, 600	P G ..	X	0.40	—
Glennevis[1]	ZVC	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Glenorchy[1]	YNU	160	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Glenpark[1]	XEB	140	J. & J. Denholm	300, 600	P G ..	X	0.40	—
Glensanda[1]	ENV	145	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Glenshane[1]	XIO	150	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Glenshiel[1]	YZC	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Glensloy[1]	YDF	135	Easton, Greig & Co.	300, 600	P G ..	X	0.40	—
Glenspean[1]	ZAB	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	—	—
Glenspey[1]	ZHP	150	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Glenstral[1]	EQR	150	Glen Line (Macgregor Gow & Co., Ltd.)	300, 600	P G ..	X	0.40	—
Glint[1]	XFP	100	S. Clarke & Co.	300, 600	P G ..	X	0.05	0.50
Glitra[1]	XFW	145	Chr. Salvesen Co.	300, 600	P G ..	X	0.40	—
Globe[1]	ZEV	145	Fisher Alimonda & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Glofield[1]	YGX	180	Humphries (Cardiff), Ltd. ..	300, 600	P G ..	X	0.40	—
Gloria de Larrinaga[1] ..	ELA	—	Larrinaga & Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Gloucester Castle[1] ..	MQZ	170	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Gloucestershire[1] ..	MYG	250	Bibby Bros. & Co.	300, 600	P G ..	X	0.40	—
Glyndwr[1]	GBWC	115	Connell & Grace	300, 600	P G ..	X	0.40	—
Goalpara[1]	GCBW	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Gogra[1]	GCLB	175	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Gondia[1]	GCMN	—	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Golconda[1]	GCKP	—	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Goorkha[1]	MQW	230	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Gorala[1]	GCLD	—	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge.		Notes.
							Per Word.	Minimum per Radio-telegram.	
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Gorden Castle[1]	ZNN	170	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Gordonia[13]	ZTL	—	Gordon S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Gothic[1]	BJV	190	W. H. Cockerline & Co.	300, **600**	P G	X	0.40	—	
Gothic Prince[1]	XIU	155	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Gourko[1]	ODX	120	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Governor ENE[1]	ENE	140	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Gracchus[1]	GDF	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Gracefield[1]	OCY	130	Adelaide S.S. Co.	300, **600**	P G	X	0.40	—	
Graciana[1]	ZFD	160	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Graf Stroganoff[1]	ZOU	—	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	—	—	
Graf Waldersee	GBZM	—	P. & O. S.N. Co., Ltd.	—	—	—	—	—	
Grainton[1]	YPN	150	R. Chapman & Son	300, **600**	P G	X	0.40	—	
Grampian[1]	MRN	230	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	N	0.40	—	
Grampian Range[1]	ZNC	140	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Grangemouth[1]	GBNP	170	Rankine Line, Ltd.	300, **600**	P G	X	0.05	0.50	
Grangepark[1]	GCNW	—	J. J. Denholm	—	—	—	—	—	
Grantley[1]	OEC	125	Furness, Withy & Co., Ltd.	300. **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Grantully Castle[1]	MOQ	210	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Graphic[1]	LSJ	160	Belfast S.S. Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Gray	YBL	—	Victoria Whaling Co., Ltd.	300, **600**	P R	X	—	—	
Great City[1]	MKW	200	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Great Southern[8]	YZV	110	G.W. Railway Co.	300, **600**	—	—	—	—	
Great Western[8]	YZW	110	G.W. Railway Co.	300, **600**	—	—	—	—	
Grebe OCE[2]	OCE	—	General S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Grecian Prince[1]	YRN	150	Prince Line, Ltd.	300, **600**	P G	X	0.40	—	

Greenore[1]	GUS	250	L. & N.W. Railway Co.	300, 600	P G ..	N	0.05	0.50
Greenwich[1]	BFB	120	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Gregory YLG[1] ..	YLG	200	Booth S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Greiffenfels[1]	GBLV	—	F. & W. Ritson	300, 600	P G ..	X	0.40	—
Grelarlie[1]	YFS	145	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Grelbank[1]	BQP	150	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Grelben[1]	YBR	145	Marine Trans. Co.	300, 600	P G ..	X	0.40	—
Grelcaldy[1]	ZUW	140	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Greldon[1]	BQK	150	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Greleden[1]	BCB	150	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Grelfryda[1]	LSV	—	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Grelgrant[1]	YXZ	145	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Grelhead[1]	ZCX	145	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Grelisle[1]	OER	150	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Grelorm[1]	BFT	130	T. C. Tucker	300, 600	P G ..	X	0.40	—
Grelrosa[1]	XHL	150	J. C. Gould & Co.	300, 600	P G ..	X	0.40	—
Grelstone[1]	EPF	150	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Grelwen[1]	ZZI	155	J. C. Gould & Co.	300, 600	P G ..	X	—	—
Greystoke Castle[1] ..	ZYM	145	J. Chambers & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Grianaig[1]	MOQ	—	Lord Dunraven	300, 600	P ..	X	—	—
Grindon Hall[1] ..	YAY	170	Wm. McAllum & Co.	300, 600	P G ..	X	0.40	—
Grigua[1]	ZPT	145	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Grodna[1]	GBVY	140	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.40	—
Guatemala[1]	MWM	220	Pacific S.N. Co., Ltd.	300, 600	P G ..	N	0.40	—
Gudron[1]	GBLM	—	Glover Bros.	300, 600	P G ..	X	—	—
Guildford Castle[1] ..	MPZ	220	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	N	0.40	—
Gujaral[1]	GBO	190	A. Weir & Co.	300, 600	P G ..	N	0.40	—
Gulf of Suez[1]	XEF	120	Westcott & Laurence, Ltd. ..	300, 600	P G ..	X	0.40	—
Gundreda[1]	—	130	All Seas Marine & Salvage Co., Ltd.	300, 600	P G ..	X	0.40	—
Gundomar[1]	GBFL	—	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Gurna[1]	GCZD	—	British India S.N. Co., Ltd. ..	—	—	—	—	—
Gustav[1]	GBVS	110	Morel, Ltd.	300, 600	P G ..	X	0.40	—
Gwladys[1]	BQK	140	P. Samuel & Co., Ltd.	300, 600	P G ..	X	0.40	—
Gwmeric[1]	BPZ	180	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Gyp[1]	BFS	135	Becker & Co., Ltd.	300, 600	P G ..	X	0.40	—
Hagen[1]	GBYW	—	British India S.N. Co.. Ltd. ..	—	—	—	—	—
Haigtown[1]	ZDA	—	Town Line (London), Ltd. ..	300, 600	P G ..	X	0.40	—
Haimon[1]	GBNX	—	T. L. Duff & Co.	—	—	—	—	—
Haleric[1]	YHA	145	A. Weir & Co.	300, 600	P G ..	X	0.40	—
H. M. Pellatt[1] ..	YJV	125	Canada S.S. Lines, Ltd.	300, 600	P G ..	X	0.40	—
Haliartus[1]	GBQJ	150	R. P. Houston & Co.	300, 600	P G ..	X	0.40	—
Halizones[1]	EVP	155	R. P. Houston & Co.	300, 600	P G ..	X	0.40	—
Hallside[1]	GCMP	170	Charlton McAllum	—	—	—	—	—
Halo[1]	GCLX	130	Stephenson Clarke & Co. ..	—	—	—	—	—
Hambleton Range[1] ..	YPJ	190	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Hamburg[1]	GBMR	—	W. A. Young & Co.	300, 600	P G ..	X	0.40	—
Hamm[1]	ZXT	170	Federal S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Hampstead [1]	EZT	135	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hampstead Heath [1]	EIE	180	S.N. Co. of Canada, Ltd.	300, **600**	P G	X	0.40	—	
Hannah [1]	ZYA	—	F. Rahtkens & Co.	300, **600**	P G	X	0.40	—	
Hannington Court [1]	LUB	150	Haldin & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hannover [1]	GBYX	—	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Hans Hemsoth [1]	XKU	125	Everett & Newbigin	300, **600**	P G	N	0.15	1.50	
Hans Wilhelm Heinsoth [1]	GBWV	—	Haldin & Co.	—	—	—	—	—	
Hantonia [1 16]	GIL	170	L. & S.W. Railway Co.	300, **600**	P G	X	0.15	1.50	
Hardanger [1]	MOB	125	G. B. Harland & Co.	300, **600**	P G	X	0.40	—	
Haresfield [1]	GBQR	160	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Harlem [1]	BGS	145	Brown, Jenkinson & Co.	300, **600**	P G	X	0.40	—	
Harlow [1]	YAR	120	Harrison's, Ltd.	300, **600**	P G	X	0.40	—	
Harlseywood [1]	BUH	140	Joseph Constantine	300, **600**	P G	X	0.40	—	
Harmodius [1]	GCBX	150	R. P. Houston	—	—	—	—	—	
Harmonic [1]	GCBQ	120	Jenkins, Richards & Evans	300, **600**	P G	X	0.40	—	
Harperley [1]	EXC	180	J. & C. Harrison, Ltd.	300, **600**	P G	X	0.40	—	
Harold Jasper [1]	XXY	150	Swift S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hartfield [1]	EVL	145	Woods, Tylor & Brown	300, **600**	P G	X	0.40	—	
Hartington [1]	MJX	145	J. & C. Harrison, Ltd.	300, **600**	P G	X	0.40	—	
Hartlepool [1]	ZWS	160	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hartmore [1]	YXL	—	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hartside [1]	ZNJ	130	Charlton, McAllum & Co.	300, **600**	P G	X	0.40	—	
Harvestehude [1]	GBQD	—	R. S. Dalgliesh	300, **600**	P G	X	0.40	—	
Haslemere [1]	YXI	120	Furness, Withy & Co., Ltd.	300, **600**	P G	N	0.40	—	
Hatarana [1]	YUZ	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hatimura [1]	XJB	150	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hatkhola [1]	YUY	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hatipara [1]	BHH	150	British India S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Haverford [1]	MJH	250	International Nav. Co., Ltd.	300, **600**	P G	N	0.40	—	
Havildar [1]	BMD	180	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Havre [1]	ZEW	135	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Haworth [1]	GBRN	—	R. S. Dalgliesh	300, **600**	P G	X	0.40	—	
Hazel Branch	ZGZ	150	F. & W. Ritson	300, **600**	P G	X	—	—	
Hazelmoor [1]	YII	145	W. Runciman & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hazelside [1]	GCKT	—	Charlton, McAllum & Co.	300, **600**	P G	X	0.40	—	
Headcliffe [1]	BUB	140	G. T. Readhead & Co.	300, **600**	P G	X	0.40	—	
Heathmore [1]	MXS	135	W. R. Davies	300, **600**	P G	X	0.40	—	
Hebburn ELY [1]	ELY	—	J. McKelvie	300, **600**	P G	X	0.40	—	

Hebe	GBLJ	—	C. T. Bowring & Co., Ltd.	300, 600	P G	X	0.40	—
Hector[1]	ZJS	—	A. Holt & Co.	300, 600	P G	X	0.40	—
Hedwig Heidmann	GBXJ	—	A. Crawford & Co.	300, 600	P G	X	0.40	—
Heilbronn	GBFD	—	Geo. Dodd & Co., Ltd.	300, 600	P G	X	—	—
Helenus[1]	ZJT	230	A. Holt & Co.	300, 600	P G	X	0.40	—
Hellenes[1]	EOW	220	R. P. Houston & Co.	300, 600	P G	X	—	—
Helmsdale[1]	YEG	120	E. C. Downing	300, 600	P G	X	0.40	—
Helmsloch[1]	ZXB	130	E. C. Downing	300, 600	P G	X	0.40	—
Helredale[1]	YHC	150	Turnbull, Scott & Co	300, 600	P G	X	0.40	—
Heluan[1]	GBDN	—	Elder Dempster & Co., Ltd.	300, 600	P G	X	—	—
Hendon[1]	YTS	135	Cory Colliers, Ltd.	300, 600	P G	X	0.05	0.50
Henry Holmes[3]	XJH	—	West India & Panama Tel. Co., Ltd.	300, 600	P G	X	0.40	—
Henzada[3]	GWD	180	P. Henderson & Co.	300, 600	P G	10 a.m. to 12 n. 4 to 6 p.m. 8 to 12 (midnight)	0.40	—
Herefordshire[1]	MYA	250	Bibby Bros. & Co...	300, 600	P G	X	0.40	—
Herman Sauber[1]	GBNY	—	T. L. Duff & Co.	—	—	—	—	—
Hermione END[1]	END	200	C. T. Bowring & Co., Ltd.	300, 600	P G	X	0.40	—
Heroic[1]	GCTX	—	Belfast S.S. Co.	300, 600	P G	X	0.05	0.50
Heronspool[1]	BFI	145	Sir R. Ropner & Co.	300, 600	P G	X	—	—
Herschel[1]	MUA	180	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Hersfeld[1]	GBSD	—	F. C. Strick & Co.	300, 600	P G	X	0.40	—
Hesleyside[1]	ZXH	150	Charlton, McAllum & Co.	300, 600	P G	X	0.40	—
Highland Enterprise[1]	MDA	170	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Glen[1]	GIR	200	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Heather[1]	MEK	230	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Laddie[1]	GIU	200	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Laird[1]	MEP	180	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Loch[1]	GIY	220	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Piper[1]	GNM	220	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Pride[1]	GJA	220	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Rover[1]	GJB	200	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Star[1]	ZLH	220	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Highland Watch[1]	MER	230	H. & W. Nelson, Ltd.	300, 600	P G	X	0.40	—
Hilda[1]	GBVQ	—	R. Gordon	300, 600	P G	X	0.40	—
Hildebrand[1]	MDM	200	Booth S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Hilde Hugo Stinnes[1]	GBXF	—	J. Cormack & Co.	300, 600	P G	X	0.40	—
Hillhouse[1]	LTF	145	J. Cory & Sons, Ltd.	300, 600	P G	X	0.40	—
Hillingdon[1]	MYT	130	Cory Colliers, Ltd...	300, 600	P G	X	0.05	0.50
Himalaya[1]	MNY	130	P. & O. S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Hindoo[1]	YPZ	—	Ellerman's Wilson Line, Ltd.	300, 600	P G	X	0.40	—
Hindustan ZNO[1]	ZNO	180	Common Bros.	300, 600	P G	X	0.40	—
Historian[1]	MHT	210	T. & J. Harrison	300, 600	P G	X	0.40	—
Hitchin[1]	BAA	110	Cory Colliers, Ltd.	300, 600	P G	X	0.05	0.50
Hocking[1]	XFA	170	J. Cory & Sons, Ltd.	300, 600	P G	X	0.40	—
Holbein[1]	MUB	190	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Holbrook BPU[1]	BPU	200	Canadian Pacific Railway Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Hollinside[1]	ZXU	150	Charlton McAllum & Co.	300, 600	P G	X	0.40	—
Hollyleaf[1]	EZJ	220	British Tanker Co., Ltd.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Holms Island [1]	ZMD	150	Lewis & Pardoe Williams	300, **600**	P G	X	0.40	—	
Holtby [1]	BOW	140	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Holywell [1]	YED	150	Well Line, Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Homayun [1]	GCDS	—	Bombay & Persia S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Homefield [1]	YAU	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Homer City [1]	GAB	220	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Honorius [1]	GJE	170	R. P. Houston & Co.	300, **600**	P G	X	0.40	—	
Hopelyn [1]	YFJ	120	Stamp, Mann & Co.	300, **600**	P G	X	0.15	1.50	
Horden [1]	EYR	115	Burnett & Co.	300, **600**	P G	X	0.40	—	
Hornby Castle [1]	ZVM	160	J. Chambers & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Horncap [1]	GBFN	—	Macbeth & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hornchurch [1]	GCDL	125	J. Hudson & Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Hornfels [1]	GBFR	—	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Hornsee [1]	GBLZ	—	J Westoll	300, **600**	P G	X	—	—	
Hornsey [1]	ZAT	115	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Horn Shell [1]	XLC	210	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Hororata [1]	MRF	230	New Zealand Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Horseferry [1]	XFO	100	S. Clarke & Co.	300, **600**	P G	X	0.05	0.50	
Hortensius [1]	ETG	170	R. P. Houston & Co.	300, **600**	P G	X	0.40	—	
Hostilius [1]	EOX	190	R. P. Houston & Co.	300, **600**	P G	X	—	—	
Hotham Newton [1]	XHI	145	J. M. Lennard & Sons, Ltd.	300, **600**	P G	X	0.40	—	
Hounslow [1]	YKI	150	Watts, Watts & Co., Ltd.	300, **600**	P G	X	—	—	
Hova [1]	BGQ	170	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Huanchaco [1]	GJF	200	Pacific S.N. Co., Ltd.	300, **600**	P G	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—	
Huberfels [1]	GBRV	—	Glen & Co.	300, **600**	P G	X	0.40	—	
Hubert [1]	MVI	180	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Huddersfield [1]	YGC	170	W. Hepburn & Co.	300, **600**	P G	X	0.40	—	
Hunnie [1]	BRM	—	Grahams & Co.	300, **600**	P G	X	—	—	
Hunsgate [1]	ZYI	120	W. Robertson	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Hunslet[1]	BSK	170	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Hunstanworth[1]	GCDZ	170	R. S. Dalgliesh	—	—	—	—	—
Hunsworth[1]	LSB	200	John Herron & Co.	300, 600	P G	X	0.40	—
Huntball[1]	YCY	160	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Huntress[1]	YVF	—	G. Heyn & Sons	—	—	X	—	—
Huntscape[1]	GXU	—	W. Robertson	300, 600	P G	X	0.40	—
Huntscastle[1]	ZQU	170	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Huntsclyde[1]	BRJ	—	Clyde Shipping Co.	300, 600	P G	X		—
Huntsend[1]	YRZ	—	Union-Castle Mail S.S. Co., Ltd.	300, 600	—	—	—	—
Huntsgreen[1]	YRO	150	Orient S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Huntsgulf[1]	YRR	—	F. C. Strick & Co., Ltd.	300, 600	P G	X	—	—
Huntshead[1]	YEN	150	Jenkins Bros.	300, 600	P G	X	0.40	—
Huntspill[1]	ZTQ	240	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Hurliness[1]	BNL	135	W. R. Smith & Sons	300, 600	P G	X	0.40	—
Huronian[1]	YZM	200	F. Leyland & Co., Ltd.	300, 600	P G	—	—	—
Hurstside[1]	BNV	160	Charlton McAllum & Co., Ltd.	300, 600	P G	X	0.40	—
Hyacinthus[1]	GJG	200	R. P. Houston & Co.	300, 600	P G	X	0.40	—
Hyanthes[1]	EJJ	190	R. P. Houston & Co.	300, 600	P G	X	0.40	—
Hydaspes[1]	GJH	200	R. P. Houston & Co.	300, 600	P G	X	0.40	—
Hyltonia[1]	YQV	125	Maindy Shipping Co.	300, 600	P G	—	0.40	—
Hymettus[1]	GCPL	170	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Hypatia[1]	GJI	190	R. P. Houston & Co.	300, 600	P G	X	0.40	—
Hyrcania[1]	ZZS	145	Caspian Oil Co., Ltd.	300, 600	P G	X	0.40	—
Hyson[1]	ZKI	180	A. Holt & Co.	300, 600	P G	X	0.40	—
Ibex[2]	MSC	120	G.W. Railway Co.	300, 600	P G	N	0.05	0.50
Idaho GJJ[1]	GJJ	250	Ellerman's Wilson Line, Ltd.	300, 600	P G	9 a.m. to 1 p.m.	0.40	—
						2 to 5 p.m.		
						6 to 10 p.m.		
Ida Zelck[1]	GCVP	—	Bell Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Iddesleigh[1]	ELF	140	Mediterranean Cargo Steamers Ltd.	300, 600	P G	X	0.40	—
Idomeneus[1]	GZY	210	A. Holt & Co.	300, 600	P G	N	0.40	—
Ikala[1]	ZUT	170	J. H. Welsford & Co., Ltd.	300, 600	P G	X	0.40	—
Ilford[1]	YKL	145	Watts, Watts & Co., Ltd.	300, 600	P G	X	0.40	—
Ilmenau[1]	GBYN	135	Geo. Heyn & Sons	—	—	—	—	—
Imani[1]	ZDO	—	T. & J. Brocklebank, Ltd.	—	—	X	—	—
Imber[1]	YFD	160	Cork S.S. Co., Ltd.	300, 600	P G	X	0.05	0.50
Imkenturm	GCVJ	—	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Imperator[1]	GBZW	—	Cunard Line	300, 600	P G	X	0.40	—
Inanda[1]	MID	180	T. & J. Harrison	300, 600	P G	N	0.40	—
Inca[2]	MIF	190	Pacific S.N. Co., Ltd.	300, 600	P G	9 to 11 a.m.	0.40	—
						8 p.m. to 2 a.m.		
Inchmoor[1]	YIJ	145	W. Runciman & Co., Ltd.	300, 600	P G	X	0.40	—
Indian[1]	MHB	190	F. Leyland & Co., Ltd.	300, 600	P G	N	0.40	—
Indian Transport[1]	ZDR	120	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Indianola[1]	ODF	145	J. H. Welsford & Co., Ltd.	300, 600	P G	X	0.40	—
Indore[1]	GMI	210	Elder Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Ingleby[1]	MXI	140	Sir R. Ropner & Co., Ltd.	300, 600	P G	X	0.40	—
Ingoma[1]	GDV	—	T. & J. Harrison	300, 600	P G	N	0.40	—
Inishboffin[1]	LSN	—	Limerick S.S. Co., Ltd.	300, 600	P G	X	—	—
Inkula[1]	ODG	—	J. H. Welsford & Co.	300, 600	P G	X	0.40	—
Innerton[1]	YFN	—	R. Chapman & Son	300, 600	P G	X	0.40	—
Intaba[1]	MIP	180	T. & J. Harrison	300, 600	P G	N	0.40	—
Intombi[1]	ZLL	180	T. & J. Harrison	300, 600	P G	X	0.40	—
Inventor[1]	MVY	180	T. & J. Harrison	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Inverawe	ZTD	135	J. Currie & Co.	300, **600**	P G ..	X	0.40	—	
Inveresk [1]	EOU	110	H. A. McMahon	300, **600**	P G ..	X	0.15	1.50	
Inveric [1]	EPY	150	A. Weir & Co.	300, **600**	P G ..	X	0.40	—	
Inverness [1]	EIU	140	A. M. Sutherland	300, **600**	P G ..	X	0.40	—	
Invicta [3]	GUL	50	S.E. & Chatham Railway Co. (Mang. Committee)	300, **600**	P G ..	N	0.15	1.50	
Ioanna [1]	EXO	135	J. A. Mango	300, **600**	P G ..	X	0.40	—	
Ionic [1]	MWI	230	White Star Line	300, **600**	P G ..	X	0.40	—	
Iris MNI [3]	MNI	200	Pacific Cable Board	300, **600**	P ..	X	—	—	
Irishman [1]	GJK	220	British & N. Atlantic S.N. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Irish Monarch [1] ..	YGR	170	Raeburn & Verel, Ltd.	300, **600**	P G ..	X	0.40	—	
Irismere [1]	OCD	150	T. Law & Co.	300, **600**	P G ..	X	0.40	—	
Irmgard [1]	GBJD	—	T. Dunlop & Sons	300, **600**	P G ..	X	0.40	—	
Iroquois MEI [1]	MEI	160	J. Hamilton	300, **600**	P G ..	X	0.40	—	
Iserlohn	GCWB	—	British India S.N. Co., Ltd. ..	—	—	—	—	—	
Isis GAP [1]	GAP	155	P. & O. S.N. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Isis GBMY [1]	GBMY	—	Philipps, Philipps & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Islandia [1]	XJN	190	L. Walford, Ltd.	300, **600**	P G ..	X	—	—	
Ismaila [1]	GCQD	180	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Ismailia [1]	ZYH	140	Lord E. Hamilton	300, **600**	P G ..	X	0.40	—	
Itajahy [1]	GBCQ	—	Elder Dempster & Co., Ltd. ..	—	—	—	—	—	
Itauri [1]	GBTX	—	R. S. Dalgliesh	—	—	—	—	—	
Italia MAR [1]	MAR	200	Henderson Bros.	300, **600**	P G ..	N	0.40	—	
Italian Prince [1] ..	ZGK	170	Furness, Withy & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Itaura [1]	GCQF	150	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Itola [1]	GCQJ	180	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Iver Heath	XWB	—	Bishop Nav. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Ixion [1]	GRZ	170	A. Holt & Co.	300, 450, **600**	P G ..	X	0.40	4.00	
Izaston [1]	EVH	170	Edwards, Sons & Co.	300, **600**	P G ..	X	0.40	—	
J. H. Plummer [14] ..	BPD	—	Canadian Maritime Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Jabiru [1]	LTB	130	Cork S.S. Co., Ltd.	300, **600**	P G ..	X	0.05	0.50	
J. L. Lassen [1]	GCVN	—	W. A. Young & Co.	—	—	—	—	—	
Jamaica [1]	YSI	130	Royal Mail Steam Packet Co. ..	300, **600**	P G ..	X	0.40	—	
Janeta [1]	ESR	150	Maclay & McIntyre	300, **600**	P G ..	X	0.40	—	
Janus [1]	GCSR	220	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	

Jason GLH[1]	GLH	—	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Javary[1]	GBRQ	—	G. Dodd & Co.	—	—	—	—	—
Jebba[1]	YUX	—	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Jedmoor[1]	YMC	145	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Jekri[1]	BHD	—	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Jenny[1]	GBYM	—	Owen Watkin, Williams & Co. ..	—	—	—	—	—
Jerseymoor[1]	ENK	135	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Jervaulx Abbey[1] ..	ZOW	140	J. H. N. Ringrose	300, 600	P G ..	X	0.05	0.50
Jeseric[1]	OCC	—	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Joffre[1]	BRP	70	J. Lawson	300, 600	P G ..	X	—	—
John Heidmann[1] ..	GBVT	120	J. Cormack & Co.	—	—	—	—	—
John Pender[2]	MEF	200	Eastern Telegraph Co., Ltd. ..	300, 450, 600	P ..	—	0.40	—
John Sanderson[1] ..	BCI	105	Taylor & Sanderson	300, 600	P G ..	X	0.40	—
Jolly Helen[1]	YBS	—	Canadian Maritime Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Jolly Inez[1]	EPH	150	Entente S.S. Co., Ltd.	300, 600	P G ..	K	0.40	—
Juliston[1]	LSI	130	W. S. Miller & Co...	300, 600	P G ..	X	0.40	—
Junin[1]	GJL	200	Pacific S.N. Co., Ltd.	300, 600	P G ..	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—
Jura[1]	BNG	135	B. J. Sutherland & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Justin YPL[1]	YPL	220	Booth S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kabinga[1]	GCPN	140	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kaduna[1]	ZMS	170	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Kaffir Prince[1]	ZFT	160	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Kahira (El)	BRE	—	Lord E. Hamilton..	300, 600	P G ..	X	—	—
Kaikoura[1]	MRS	230	New Zealand S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kaiping[1]	YBB	145	A. W. Berry	300, 600	P G ..	X	0.40	—
Kaiser-I-Hind[1] ..	MSI	230	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kaiserin Auguste Victoria[1]	GCTM	—	Cunard Line, Ltd.	—	—	—	—	—
Kalimba[1]	ESQ	150	Maclay & McIntyre	300, 600	P G ..	X	0.40	—
Kalomo[1]	GBY	160	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kalyan[1]	YZO	200	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kamarima[1]	GNA	—	Leopold Walford & Co.	—	—	—	—	—
Kamenetz Podolsk[1] ..	YBT	—	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Kamouraska[1]	BEP	190	Edmund Roberts & Co.	300, 600	P G ..	X	0.40	—
Kanawha MNL[1] ..	MNL	250	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Kandahar[1]	MAB	190	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kandelfels[1]	GBVC	—	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kandy[1]..	BLB	—	Joseph Chadwick & Sons ..	300, 600	P G ..	X	0.40	—
Kansas MRW[1] ..	MRW	150	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kara[1]	GCNF	140	F. C. Strick & Co.	—	—	—	—	—
Karagola[1]	ZNX	260	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Karamea [1]	MSB	180	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Karapara [1]	YST	240	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Karl Leinhardt [1]	GBMX	—	O. & W. Williams & Co.	300, **600**	P G	X	0.40	—	
Karmala [1]	MTF	220	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Karnak [1]	YKV	190	J. Moss & Co.	300, **600**	P G	X	0.40	—	
Karoa [1]	BDB	230	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Karpathos [1]	GBPV	—	Glen & Co.	300, **600**	P G	X	0.40	—	
Karroo [1]	GNS	160	Ellerman & Bucknall Co., Ltd.	300, **600**	P G	X	0.40	—	
Kasama [1]	GBP	145	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kasara [1]	BLD	160	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kashgar [1]	YYL	210	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kashmir [1]	YZN	210	P. & O. S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kassala [1]	ZYD	—	Merlin Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Kastalia [1]	GCLJ	190	Donaldson Line	—	—	—	—	—	
Katanga [1]	BOZ	160	Chr. Salvesen & Co.	300, **600**	P G	X	0.40	—	
Katharine Park [1]	GRU	140	S. & J. Thompson	300, **600**	P G	X	0.40	—	
Kathiawar [1]	GCPR	170	A. Weir & Co.	300, **600**	P G	N	0.40	—	
Kathlamba [1]	GLF	170	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Katie [1]	ZRV	145	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Katuna [1]	GCPM	150	Ellerman & Bucknall S.S. Co., Ltd	300, **600**	P G	X	0.40	—	
Kazembe [1]	GYQ	145	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Keelung [1]	GCLT	140	Ellerman & Bucknall S.S. Co., Ltd.	—	—	—	—	—	
Keemun [1]	ZKP	210	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Keighley [1]	LTK	140	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Kelsomoor [1]	YMD	135	W. Runciman & Co., Ltd.	300, **600**	P G	X	0.40	—	
Kelvinbrae [1]	MFY	170	J. Black & Co.	300, **600**	P G	N	0.40	—	
Kemmel [1]	YMO	170	Kaye, Son & Co.	300, **600**	P G	X	0.40	—	
Kenbane Head [1]	GBRL	180	G. Heyn & Sons	300, **600**	P G	X	0.40	—	
Keneh [1]	BTX	150	Lord E. Hamilton	300, **600**	P G	X	0.40	—	
Kenilworth [1]	XJG	155	R. S. Dalgliesh	300, **600**	P G	X	0.40	—	
Kenilworth Castle [1]	MQF	200	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Kent ENI [1]	ENI	155	Federal S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kentucky GDN [1]	GDN	150	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Kenuta [1]	GJO	200	Pacific S.N. Co., Ltd.	300, **600**	P G	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—	

Kepwickhall[1]	ETK	150	West Hartlepool S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kerkyra[1]	GBWT	—	C. Doresa & Co.	300, 600	P G ..	X	0.40	—
Kerman[1]	ZLQ	180	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
Keyingham[1]	BMQ	180	Wood Pulp Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Keynes[1]	XFQ	—	Stephenson, Clarke & Co., Ltd. ..	300, 600	P G ..	X	0.05	0.50
Khartum[1]	YLK	—	Kaye, Son & Co., Ltd.	300, 600	P G ..	X	0.40	—
Khiva[1]	MGZ	220	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Khyber[1]	MCB	230	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Kia Ora[1]	GJP	180	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kigoma[1]	GBPT	—	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kildonan Castle[1] ..	MQK	280	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Kilkenny BFV[1] ..	BFV	—	G. E. Railway Co.	300, 600	P G ..	X	—	—
Kinfauns Castle[1] ..	MQL	220	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
King Alfred GCMX[1] ..	GCMX	135	Philipps, Philipps & Co., Ltd. ..	—	—	—	—	—
King Edward BEY[1] ..	BEY	130	J. Williamson	300, 600	P G ..	X	0.40	—
King Edward YRW[1] ..	YRW	120	Philipps, Philipps & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
King John[1]	ZTZ	150	J. McKelvie	—	—	—	—	—
Kingsbury[1]	YDT	—	Capper, Alexander & Co. ..	300, 600	P G ..	X	0.40	—
King's City[1]	LSW	160	W. R. Smith & Sons	300, 600	P G ..	X	0.40	—
Kingsmere[1]	ZRB	170	Grahams & Co.	300, 600	—	X	—	—
Kinross[1]	MXG	145	Merlin Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kinsale[1]	XEJ	140	Pennant Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kioto[1]	XEY	135	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—
Kirktown[1]	BKN	145	Harrison Sons & Co.	300, 600	P G ..	X	0.40	—
Kirkwood[1]	EPG	130	W. France, Fenwick & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kirnwood[1]	MGX	140	Joseph Constantine	300, 600	P G ..	X	0.40	—
Kittiwake[1]	GBYQ	130	Cork S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Knebworth[1]	GDCL	160	R. S. Dalgliesh	—	—	—	—	—
Knight Companion[1] ..	GKS	240	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Knight of the Garter[1] ..	MSQ	170	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Knight Prendor GBPL[1]	GBPL	—	Knight Prendor Tug Co., Ltd. ..	300, 600	P G ..	X	—	—
Knight Templar GKT[1]	GKT	200	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Knockfierna[1]	GCKY	170	Limerick S.S. Co., Ltd. ..	—	—	—	—	—
Knowsley Hall[1] ..	YYW	—	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—
Kolpino[1]	ODL	120	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.15	1.50
Konig Friedrich August[1]	GBKN	—	P. & O. S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Konigin Luise[1] ..	GBLF	—	Orient S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Koranna[1]	GYY	150	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Korean Prince[1] ..	YRS	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Kotka[1]	ODM	130	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.40	—
Koursk BTA[1]	BTA	230	Royal Mail Steam Packet Co. ..	300, 600	P G ..	X	0.40	—
Kovno[1]	ODN	125	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.15	1.50
Krasnoiarsk XUC[1] ..	XUC	—	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Kronenfels[1]	GBCD	—	J. Chambers & Co.	300, 600	P G ..	X	0.40	—
Kumara[1]	YWT	270	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kumeric[1]	GJQ	250	A. Weir & Co.	300, 600	P G ..	N	0.40	—
Kura[1]	XJJ	140	British Tanker Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Kurdistan[1]	GRJ	130	Common Bros.	300, 600	P G ..	X	0.40	—
Kurmark[1]	EKY	180	Grahams & Co.	300, 600	P G ..	X	0.40	—
Kursk[1]	XTV	—	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Kut[1]	YLF	180	Kaye, Son & Co., Ltd.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Kwai Sang [1]	GCSN	—	Indo-China S.N. Co., Ltd.	—	—	—	—	—	
Kwarra [1]	ZMT	180	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Kybfels [1]	GBFC	—	Macbeth & Co., Ltd.	300, **600**	P G	X	0.40	—	
Kyleakin [1]	BMR	145	Anglo-European Coal & Pitwood S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Labicum [1]	LUP	135	Fisher Alimonda & Co., Ltd.	300, **600**	P G	X	0.40	—	
Lackawanna GJV [1]	GJV	135	J. Hamilton	300, **600**	P G	X	0.40	—	
Lackenby [1]	BTR	140	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Lady Brassey [8]	GQS	90	Dover Harbour Board	150, **300**	P	X	—	—	
Lady Crundall [8]	GQR	90	Dover Harbour Board	300, **600**	P G	X	0.40	—	
Lady Duncannon	GCTQ	—	Dover Harbour Board	—	—	—	—	—	
Ladykirk [1]	YGU	130	J. Cory & Sons, Ltd.	300, **600**	P G	X	0.40	—	
Lady Rhondda [1]	ZIA	105	H. O. King	300, **600**	P G	X	0.40	—	
Lakonia [1]	GPW	170	Donaldson Bros., Ltd.	300, **600**	P G	X	0.40	—	
Lama [1]	GJN	140	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Lamington [1]	ETF	140	Fisher, Alimonda & Co., Ltd.	300, **600**	P G	X	0.40	—	
Lancashire [1]	YHS	200	Bibby Bros. & Co.	300, **600**	P G	X	0.40	—	
Lancaster Castle [1]	GCKR	—	J. Chambers & Co.	300, **600**	P G	X	0.40	—	
Lancastrian [1]	MBP	200	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Langley [1]	GDBR	—	Brown, Jenkinson & Co.	—	—	—	—	—	
Langton Hall [1]	ELS	145	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
La Nina [1]	BGI	140	J. D. Ross Glen & Co.	300, **600**	P G	X	0.40	—	
Lanuvium	YLI	180	Fisher, Alimonda & Co., Ltd.	300, **600**	P G	X	0.40	—	
Laomedon [1]	ZSZ	200	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Laplace [1]	LUV	170	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
La Plata GBKF [1]	GBKF	—	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Lapland YYE	YYE	200	International Nav. Co., Ltd.	300, **600**	P G	N	0.40	—	
Largo [1]	YYO	140	Pelton S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Largo Law [1]	ZOH	145	T. Law & Co.	300, **600**	P G	X	0.40	—	
Laristan [1]	YAM	120	Common Bros.	300, **600**	P G	X	0.40	—	
Larne ZRA [1]	ZRA	200	MacAndrews & Co., Ltd.	300, **600**	P G	X	0.40	—	
La Rosarina [1]	GJW	170	British & Argentine S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Las Palmas [1]	GBVM	—	R. MacIll & Co.	300, **600**	P G	X	0.40	—	
Laurel Branch [1]	ZZG	135	F. & W. Ritson	300, **600**	P G	X	0.40	—	
Laurelleaf [1]	EYC	180	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	

La Valette[1]	BDU	—	J. W. Potter	300, 600	P G	X	0.40	—
Leafield GXT[1]	GXT	145	Donald & Taylor	300, 600	P G	X	0.40	—
Lawrence	GCVQ	180	Indian Government	300, 600	P G	X	0.40	—
Leapark[1]	GBMZ	180	London & Piræus S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Le Coq[1]	EYO	—	Lane & McAndrew, Ltd.	300, 600	P G	X	0.40	—
Leeds City[1]	ERB	150	W. R. Smith & Sons	300, 600	P G	X	0.40	—
Leicester[1]	GBCP	—	Anglo-European S.S. Coal & Pitwood Co., Ltd.	300, 600	P G	X	0.40	—
Leicestershire[1]	MYL	230	Bibby Bros. & Co.	300, 600	P G	X	0.40	—
Leitrim[8]	ZBT	190	Union S.S. Co. of New Zealand, Ltd	300, 600	P G	X	0.40	—
Lena[1]	MDX	145	E. Hain & Son	300, 600	P G	X	0.40	—
Lennep[1]	GBYT	—	F. C. Strick & Co., Ltd.	300, 600	P G	X	0.40	—
Lepanto ZBA[1]	ZBA	210	Ellerman's Wilson Line, Ltd.	300, 600	P G	—	0.40	—
Lesto[1]	XKG	130	Pelton S.S. Co., Ltd.	300, 600	P G	X	0.05	0.50
Levant II.[3]	GJY	110	Eastern Telegraph Co., Ltd.	300, 450, 600	P	—	0.40	—
Levenpool[1]	ENT	140	Sir R. Ropner & Co., Ltd.	300, 600	P G	X	0.40	—
Levensau[1]	XKJ	115	Everett & Newbigin	300, 600	P G	X	0.40	—
Levnet[1]	YCU	150	Times Shipping Co.	300, 600	P G	X	0.40	—
Lexington ZAY[1]	ZAY	190	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Lhasa[1]	GKF	170	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Liberty ZCE[1]	ZCE	—	Viscount Tredegar	300, 600	P G	X	0.40	—
Lime Branch[1]	YPH	170	F. & W. Ritson	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Lindenhall[1]	EZM	145	West Hartlepool S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Linga[1]	GLJ	160	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Lingfield[1]	YDW	145	Woods, Tylor & Brown	300, 600	P G	X	0.40	—
Linmore[1]	ZUK	145	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Linnet MKI[8]	MKI	150	Liverpool Assoc. for Protection of Commercial Interests as respects Wrecked and Damaged Property	300, 600	P	X	0.05	0.50
Lippe[1]	GBFW	—	Cairns, Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Lipsos[1]	GBTQ	—	Lyle Shipping Co., Ltd.	300, 600	P G	X	0.40	—
Livingstonia[1]	YLN	150	Maclay & McIntyre	300, 600	P G	X	0.40	—
Livorno[1]	ODO	125	Ellerman's Wilson Line, Ltd.	300, 600	P G	X	0.40	—
Lizzy[1]	GBSK	—	C. T. Bowring & Co., Ltd.	300, 600	P G	X	0.10	—
Llanberis[1]	ZSJ	150	E. Thomas, Radcliffe & Co., Ltd.	300, 600	P G	X	0.40	—
Llangollen[1]	YXE	150	E. Thomas, Radcliffe & Co.	300, 600	P G	X	0.40	—
Llangorse[1]	EXF	150	Llangorse S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Llanstephan Castle[1]	MJT	230	Union-Castle Mail S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Lochiel	YCT	—	David, MacBrayne, Ltd.	300, 600	P G	—	0.40	—
Lodorer[1]	YDJ	160	Denholm Shipping Co.	300, 600	P G	X	0.40	—
Logic[1]	LSL	120	Belfast S.S. Co., Ltd.	300, 600	P G	X	0.05	0.50
Logician[1]	ENW	170	T. & J. Harrison	300, 600	P G	X	0.40	—
Lompoc[1]	ENH	170	C. T. Bowring & Co., Ltd.	300, 600	P G	X	0.40	—
Londonderry[8]	GPR	150	Midland Railway Co.	300, 400, 600	P R	N	0.05	0.50
Longnewton[1]	ZPW	105	D. N. Grimes	300, 600	P G	X	0.40	—
Loos[1]	OFV	140	W. T. Jaques	300, 600	P G	X	0.40	—
Lord Antrim[1]	ZDM	150	G. Heyn & Sons	300, 600	—	X	—	—
Lord Byron[1]	ZVL	150	Byron S.S. Co., Ltd.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Lord Downshire	YDY	145	G. Heyn & Sons	300, **600**	P G	X	0.40	—	
Lord Kelvin [3]	YRC	250	Anglo-American Tel. Co., Ltd.	300, **600**	P	X	0.40	—	
Lord Rhondda [1]	YFV	110	H. O. King	300, **600**	P G	X	0.40	—	
Lord Sefton [1]	ZVB	150	P. Samuel & Co., Ltd.	300, **600**	P G	X	0.40	—	
Lorina [1, 16]	XMB	200	L. & S.W. Railway Co.	300, **600**	P G	X	0.15	1.50	
Louth [1]	BOT	140	London Maritime Inv. Co.	300, **600**	P G	X	0.40	—	
Lowmoor [1]	YIK	145	W. Runciman & Co., Ltd.	300, **600**	P G	X	0.40	—	
Lowther Castle [1]	ZRX	140	J. Chambers & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Loyal Citizen [1]	YCK	145	Loyal Line, Ltd.	300, **600**	P G	X	0.40	—	
Lucellum [1]	ZWP	—	H. E. Moss & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Lubeck [1]	GBTY	—	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—	
Luceric [1]	YHH	155	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Lucerna [1]	MUI	—	H. E. Moss & Co.	300, **600**	P G	X	0.40	—	
Luchana [1]	OCB	150	Donald & Taylor	300, **600**	P G	X	0.40	—	
Lucient [1]	OFS	100	S. Clarke & Co.	300, **600**	P G	X	0.05	0.50	
Lucie Woermann [1]	GBDS	—	New Zealand Ship. Co., Ltd.	300, **600**	P G	X	0.40	—	
Lucigen [1]	EMJ	160	H. E. Moss & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Luciline [1]	EYP	160	Lane & Macandrew, Ltd.	300, **600**	P G	X	0.40	—	
Luga [1]	XKN	155	L. Walford, Ltd.	300, **600**	P G	X	0.40	—	
Luise Horn [1]	GBKR	—	G. Heyn & Sons	300, **600**	P G	X	0.40	—	
Lumea [1]	MBE	170	H. E. Moss & Co.	300, **600**	P G	X	0.40	—	
Lumina [1]	YFC	160	H. E. Moss & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Luneberg [1]	GCVZ	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Lunka [1]	GLM	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Lutetian [1]	EYQ	155	Lane & Macandrew, Ltd.	300, **600**	P G	X	0.40	—	
Lycaon [1]	YOZ	240	A. Holt & Co.	300, **600**	P G	X	0.40	—	

Lydia [1] [16]	YEY	200	L. & S.W. R. Co.	300, **600**	P G	X	0.15	1.50
Lynton Grange [1]	ZEN	130	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—
Lynntown [1]	OCU	—	Harrison, Sons & Co.	300, **600**	P G	X	0.40	—
Macedonia MML [1]	**MML**	**230**	**P. & O. S.N. Co.**	**300, 600**	**P G**	X	0.40	—
Macharda [1]	XJQ	155	T. & J. Brocklebank	300, **600**	P G	X	0.40	—
Mackay-Bennett [3]	MMB	200	Commercial Cable Co.	300, **600**	P	X	—	—
Mackinaw YOL [1]	YOL	200	Atlantic Transport Co., Ltd.	300, **600**	P G	X	0.40	—
Mackworth [1]	BKO	—	R. S. Dalgleish & R. I. James	300, **600**	P G	X	0.40	—
Macoris [1]	LTO	—	Houlder, Middleton & Co., Ltd.	300, **600**	P G	X	0.40	—
Madawaska BFM [1]	BFM	140	A. Weir & Co.	300, **600**	P G	X	0.40	—
Madras [1]	MSH	250	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—
Madras City [1]	**ZWH**	**160**	**W. R. Smith & Sons**	300, **600**	P G	X	0.40	—
Magdala [1]	YGS	145	Maclay & McIntyre	300, **600**	P G	X	0.40	—
Magdalena GUC [1]	GUC	250	Royal Mail S.P. Co.	300, **600**	P G	N	0.40	—
Magician [1]	EYZ	170	T. & J. Harrison	300, **600**	P G	X	0.40	—
Magic Star [2]	GCTR	—	**Blue Star Line, Ltd.**	—	—	—	—	—
Magnet [3]	MEH	140	Eastern Extension, Aust. & China Tel. Co., Ltd.	300, **600**	P	—	0.40	—
Mahana [1]	LTV	240	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—
Mahanada [2]	**GVJ**	**130**	**T. & J. Brocklebank, Ltd.**	300, **600**	P G	X	—	—
Mahia [1]	LTW	200	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—
Mahopac [1]	**YOM**	**160**	**Atlantic Transport Co., Ltd.**	**300, 600**	**P G**	X	0.40	—
Mahratta [1]	OCM	160	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Mahronda [1]	EKM	180	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Mahsud [1]	XFC	140	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Maidan [2]	**GVN**	**130**	**T. & J. Brocklebank, Ltd.**	300, **600**	P G	X	—	—
Maid of Orleans [3]	ENJ	—	S.E. & Chatham R. Co. (Managing Committee)	300, **600**	P G	X	0.40	—
Maihar [1]	LUQ	210	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Maimyo [1]	**XJO**	**125**	**Well, Ltd.**	300, **600**	P G	X	0.40	—
Main [1]	GBKS	—	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—
Maindy Abbey [1]	**EOP**	**145**	**Jenkins, Richard & Evans, Ltd.**	**300, 600**	P G	X	0.40	—
Maindy Court [1]	EPC	130	Jenkins, Richard & Evans, Ltd.	300, **600**	P G	X	0.40	—
Maindy Dene [1]	YJL	135	Jenkins, Richard & Evans, Ltd.	300, **600**	P G	X	0.40	—
Maindy Manor [1]	EPB	150	Jenkins, Richard & Evans, Ltd.	300, **600**	P G	X	0.40	—
Majestic [1]	**BEX**	**135**	**W. H. Cockerline & Co.**	300, **600**	P G	X	0.40	—
Makalla [1]	ESA	155	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Malabar [1]	**YYG**	**105**	**H. Cail & Co.**	**300, 600**	**P G**	X	0.40	—
Malakand [1]	MKX	200	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Malakuta [2]	GVI	130	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	—	—
Malancha [1]	XJP	125	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Malantian [1]	**EML**	**170**	**Graham Smith**	**300, 600**	P G	X	0.40	—
Malayan [1]	ESC	200	R. P. Houston & Co.	300, **600**	P G	X	0.40	—
Maldonado MJB [1]	MJB	170	Harris & Dixon	300, **600**	P G	X	0.40	—
Mallard [3]	EIZ	—	General S.N. Co., Ltd.	**300, 600**	P G	X	—	—
Malta GKD [1]	GKD	250	P. & O. S.N. Co.	**300, 600**	P G	X	0.40	—
Malvern Range [1]	**ZGC**	**180**	**Furness, Withy & Co., Ltd.**	**300, 600**	**P G**	X	0.40	—
Malwa [1]	MMD	250	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—
Mamari [1]	GKE	200	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—
Manaar [1]	LUR	200	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—
Manavi [1]	GYO	170	Pacific S.N. Co.	300, **600**	P G	N	0.40	—
Manchester Brigade [1]	EKW	155	Manchester Liners, Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Manchester City [1] ..	GKH	190	Manchester Liners, Ltd.	300, **600**	P G ..	7 a.m. to 11 p.m.	0.40	—	
Manchester Civilian [1] ..	ZQV	155	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Corporation [1]	YYB	155	Manchester Liners, Ltd.	300, **600**	P G ..	7 a.m. to 11 p.m.	0.40	—	
Manchester Division [1] ..	BLZ	140	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Exchange [1]	ZQW	170	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Hero [1] ..	ZBE	170	Manchester Liners, Ltd.	300, **600**	P G ..	7 a.m. to 11 p.m.	0.40	—	
Manchester Importer [1]	ZQY	170	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Mariner [1] ..	ZQZ	170	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Merchant [1]	ZQL	165	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Port [1] ..	ZQN	160	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Manchester Skipper [1] ..	ZOF	160	Manchester Liners, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Manchurian Prince[1] ..	ETV	—	Furness, Withy & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Manco[1]	GQZ	200	Booth S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—
Mandala[1]	YTJ	230	British India S.N. Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Mandalay[2]	GWP	180	P. Henderson & Co.	300, **600**	P G ..	10 to 12 a.m. 4 to 6 p.m. 8 p.m. to 12 p.m.	0.40	—
Manhattan GKK[1] ..	GKK	250	Atlantic Transport Co., Ltd. ..	300, **600**	P G ..	N	0.40	—
Manica[1]	YZI	—	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G ..	X	—	—
Manitou ZWZ[1] ..	ZWZ	250	Atlantic Transport Co., Ltd. ..	300, **600**	P G ..	N	0.40	—
Manora[1]	GIT	230	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—
Mantua[1]	MME	190	P. & O. S.N. Co.	300, **600**	P G ..	X	0.40	—
Manx Isles[1]	LTR	170	Lowden, Connell & Co	300, **600**	P G ..	X	0.40	—
Manzanares[1]	MLS	150	Elders & Fyffes, Ltd.	300, **600**	P G ..	X	0.40	—
Maple Branch[1] ..	ZIV	—	F. & W. Ritson	300, **600**	P G ..	X	0.40	—
Mapleleaf[1]	EYB	200	British Tanker Co...	300, **600**	P G ..	X	0.40	—
Maplemore[1]	ZND	170	Furness, Withy & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—
Mapleton[1]	XHD	—	Canada S.S. Lines, Ltd.	300, **600**	P G ..	X	0.40	—
Marathon[1]	MGJ	220	G. Thompson & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—
Maraval[2]	GWH	100	Trinidad Shipping & Trading Co., Ltd.	300, **600**	P G ..	N	0.40	—
Marconi[1]	ZBC	230	Lamport & Holt	300, **600**	P G ..	N	0.40	—
Mardinian[1]	GBWN	—	Ellerman's Lines, Ltd.	300, **600**	P G ..	X	0.40	—
Marengo[1]	GKJ	170	Ellerman's Wilson Line, Ltd. ..	300, **600**	P G ..	8 a.m. to 1 p.m. 2 to 5 p.m. 6 to 10 p.m.	0.40	—
Maresfield[1]	YQK	140	Woods, Tylor & Brown	300, **600**	P G ..	X	0.40	—
Margha[1]	BOY	170	British India S.N. Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Maria de Larrinaga ..	EMA	170	Larrinaga & Co.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Marie Rose[1]	YEH	170	Ellerman's Wilson Line, Ltd. ..	300, **600**	P G ..	X	0.40	—
Marie Therese[1] ..	YHV	140	Bay S.S. Co., Ltd...	300, **600**	P G ..	X	0.40	—
Marksburg[1]	GBVP	—	A. Crawford & Co.	300, **600**	P G ..	X	0.40	—
Marlwood[1]	EKO	105	H. A. Brightman & Co.	300, **600**	P G ..	X	0.15	1.50
Marmora[1]	MMR	250	P. & O. S.N. Co.	300, **600**	P G ..	X	0.40	—
Maronian[1]	EMN	150	Graham Smith	300, **600**	P G ..	X	0.40	—
Marquesa[1]	ZQD	150	Furness, Houlder & Argentine Lines, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Marsden[1]	BJJ	105	Burnett & Co.	300, **600**	P G ..	X	0.40	—
Marshal Haig[1].. ..	YLW	—	Marshall Shipping Co., Ltd. ..	300, **600**	P G ..	X	0.40	—
Martaban[2]	GWC	140	P. Henderson & Co.	300, **600**	P G ..	10 to 12 a.m. 4 to 6 p.m. 8 to 12 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Marwarri [1]	ZZZ	—	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—	
Mary Horlock [1]	GBNZ	170	F. W. Horlock	300, **600**	P G	X	0.40	—	
Maryland [1]	MBW	170	Atlantic Transport Co., Ltd.	300, **600**	P G	X	0.40	—	
Marylebone [3]	YMQ	—	Great Central Railway	300, **600**	—	X	—	—	
Masconomo [2]	GTR	125	Standard Transportation Co., Ltd.	300, **600**	P	X	—	—	
Masirah [1]	MPX	190	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—	
Maskinonge	YBE	—	Wm. Roberts & Son	300, **600**	P G	X	—	—	
Massasoit GTB [2]	GTB	125	Standard Transportation Co., Ltd.	300, **600**	P	X	—	—	
Massilia [1]	MHQ	230	Henderson Bros.	300, **600**	P G	X	0.40	—	
Massis [1]	ZZE	145	F. Gilbert	300, **600**	P G	X	0.40	—	
Masula [1]	GBSQ	230	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Masuria [1]	GBJM	—	Macbeth & Co.	300, **600**	P G	X	0.40	—	
Matadi [1]	GBCK	170	Elder, Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Matador [1]	YTC	170	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Matatua [1]	GKL	200	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Ma eba [1]	GCLY	150	Elder, Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Matheran [1]	MMX	200	T. & J. Brocklebank	300, **600**	P G	X	0.40	—	
Matina [1]	MLT	190	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40	—	
Matoppo [1]	MAM	145	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Matra [1]	ZZD	180	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—	
Mattawa [1]	YTT	180	Canadian Pacific Ocean Service, Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Matura [1]	GYD	180	Trinidad Shipping & Trading Co., Ltd.	300, **600**	P G	N	0.40	—	
Mauretania [1]	MGA	350	Cunard S.S. Co., Ltd.	110, 300, **600**	P G	N	0.40	—	
Mayaro [14]	MFR	170	Trinidad Shipping & Trading Co., Ltd.	300, **600**	P G	N	0.40	—	
Maylands [1]	EXE	140	Edward Sons & Co.	300, **600**	P G	X	0.40	—	
Meckle burg GBTM [1]	GBTM	—	P. Henderson & Co.	300, **600**	P G	X	0.40	—	
Mecklenburg XFX [1]	XFX	110	J. Currie & Co.	300, **600**	P G	X	0.40	—	
Media [1]	ZTC	200	T. & J. Brocklebank, Ltd.	300, **600**	P G	X	0.40	—	
Median [1]	ZGP	170	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Medic [1]	MKK	250	White Star Line	300, **600**	P G	X	0.40	—	
Medomsley [1]	EZS	145	F. Carrick & Co.	300, **600**	P G	X	0.40	—	
Medway [1]	YYD	—	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Megantic [1]	MZC	200	White Star Line	300, **600**	P G	N	0.40	—	

Megna[1]	EQP	200	James Nourse, Ltd.	300, 600	P G ..	X	0.40	—
Meissonier[1]	GWZ	200	Lamport & Holt, Ltd.	300, 600	P G ..	N	0.40	—
Melania[1]	MPP	240	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Meline[1]	ZSF	180	H. E. Moss & Co.	300, 600	P G ..	X	0.40	—
Melita BNB[1]	BNB	270	Canadian Pacific Ocean Service, Ltd.	300, 600	P G ..	N	0.40	—
Mellifont[3]	YWN	110	Lancs. & Yorks. Railway Co. ..	300, 600	P G ..	N	0.05	0.50
Melmore Head[1] ..	XJC	150	G. Heyn & Sons	300, 600	P G ..	X	0.40	—
Meltonian[1]	ZGQ	170	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Melville YSE[1] ..	YSE	200	Elder, Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Memnon[1]	MIG	155	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Menapian[1]	XIT	200	O. & W. Williams & Co.	300, 600	P G ..	X	0.40	—
Mendip Range[1] ..	ZRT	180	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Menelaus[1]	BET	135	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Menevian[1]	XEZ	200	O. & W. Williams & Co.	300, 600	P G ..	X	0.40	—
Menominee[1]	MNE	250	Atlantic Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Mentor YOA[1]	YOA	180	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Mercedes BLF ..	BLF	—	H. Rees, Jones & Co.	300, 600	P G ..	X	—	—
Mercedes de Larrinaga[1]	EJN	200	Larrinaga & Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Merchant[1]	EIG	155	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Merchant Prince[1] ..	ZFU	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Mercian[1]	YVT	170	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Mercuria[1]	YTM	150	Donaldson Bros., Ltd.	300, 600	P G ..	N	0.40	—
Merganser[1]	GCTL	—	Cork S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Merion[1]	MJM	—	International Nav. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Merkara[1]	GMY	225	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Mersey MWJ[3] ..	MWJ	135	Lancs. & Yorks Railway Co. ..	300, 600	P G ..	X	0.40	—
Mesaba EOV[1] ..	EOV	—	Atlantic Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Mesopotamia[1] ..	EVA	155	Westminster Shipping Co., Ltd ..	300, 600	P G ..	X	0.40	—
Messina[1]	ZFK	155	Gulf Line, Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Metagama[1]	YZQ	240	Canadian Pacific Ocean Services, Ltd.	300, 600	P G ..	N	0.40	—
Meteor GBSP[1]	GBSP	—	Royal Mail Steam Packet Co. ..	300, 600	P G ..	X	0.40	—
Methven[1]	YLZ	175	Canadian Pacific Railway Co. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Mexican Prince[1] ..	YJH	150	Southern Whaling & Sealing Co., Ltd.	300, 600	P G ..	X	0.40	—
Mexico MWG[1]	MWG	170	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Michael[1]	GWV	—	Booth S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Michigan GKM[1] ..	GKM	220	Atlantic Transport Co., Ltd. ..	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Middleham Castle[1]	ZVJ	145	J. Chambers & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Millais[1]	LST	225	Lamport & Holt, Ltd.	300, **600**	P G	N	0.40	—	
Millpool[1]	LTJ	150	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Miltiades[1]	MGF	200	G. Thompson & Co., Ltd.	300, **600**	P G	X	0.40	—	
Milton BBX[1]	BBX	135	Glover Bros.	300, **600**	P G	X	0.40	—	
Min[1]	BSL	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Mineric[1]	LSC	150	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Minia[8]	GUQ	150	Anglo-American Tel. Co., Ltd.	300, **600**	P	X	—	—	
Minna Horn[1]	GBWX	—	Haldin & Co.	300, **600**	P G	X	0.40	—	
Minnedosa[1]	GZX	180	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	X	0.40	—	
Minnekahda[1]	LTQ	180	Atlantic Transport Co., Ltd.	300, **600**	P G	N	0.40	—	
Minnie de Larrinaga[1]	MLA	170	Larrinaga & Co.	300, **600**	P G	X	0.40	—	
Mississippi GRI[1]	GRI	200	Atlantic Transport Co., Ltd.	300, **600**	P G	X	0.40	—	
Missouri MLG[1]	MLG	140	Atlantic Transport Co., Ltd.	300, **600**	P G	X	0.40	—	
Mitra[1]	MZH	210	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Mobile[1]	GBZX	—	P. & O. S.N. Co.	—	—	—	—	—	
Modesta[1]	YMY	160	Gulf Line, Ltd.	300, **600**	P G	X	0.40	—	
Mokta[1]	YGA	150	F. C. Strick & Co., Ltd.	300, **600**	P G	X	0.40	—	
Molesey[1]	ZXV	140	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Moliere[1]	ZBN	200	Lamport & Holt, Ltd.	300, **600**	P G	N	0.40	—	
Molton[1]	GCYJ	130	Lord Glanely	—	—	—	—	—	
Mombassa ZAK[1]	ZAK	—	Maclay McIntyre	—	—	—	—	—	
Monadnock MIX[1]	MIX	150	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Monarch GTS[18]	GTS	100	Post-Master General (Cables S)	300	—	—	0.05	0.50	
Monarch ZBS[1]	ZBS	200	Elder, Dempster & Co., Ltd.	300, **600**	P G	—	0.40	—	
Monestoy[1]	ZFE	155	Leopold Walford (London), Ltd.	300, **600**	P G	X	0.40	—	
Mongolian Prince[1]	YWO	—	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Monkshaven	YCJ	145	Rhondda Merthyr Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Monmouth MGV[1]	MGV	155	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	X	0.40	—	
Monnette[1]	YXG	160	Brown, Jenkinson & Co.	300, **600**	P G	X	0.40	—	
Moutana YJY[1]	YJY	140	H. E. Moss & Co.	300, **600**	P G	X	0.40	—	
Montazah[1]	GCLZ	—	Khedivial Mail S.S. Co.	—	—	—	—	—	

Montcalm BGE[1]	BGE	170	Canadian Pacific Railway Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Montenegro BMQ[1]	EMQ	155	Elder, Dempster & Co., Ltd.	300, 600	P G	X	0.40	—
Montezuma[1]	XKY	150	Canadian Pacific Railway	300, 600	P G	X	0.40	—
Montilla[1]	ZXO	190	Blue Star Line, Ltd.	300, 600	P G	X	0.40	—
Montrose[1]	GCBY	—	Trinder, Anderson & Co.	300, 600	P G	X	0.40	—
Moora[1]	OCA	200	India Office	300, 600	P G	—	0.40	—
Moorby[1]	BTP	150	Sir R. Ropner & Co., Ltd.	300, 600	P G	X	0.40	—
Moorish Prince[1]	YYK	190	Furness, Withy & Co., Ltd.	300, 600	P G	N	0.40	—
Morea[1]	MMF	250	P. & O. S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Morinier[1]	YHG	120	Lloyd Royal Belge (Great Britain), Ltd.	300, 600	P G	X	0.40	—
Morocco[1]	ZVV	210	Ellerman's Wilson Line, Ltd.	300, 600	P G	9 a.m. to 1 p.m. 3 to 6 p.m. 8 to 11 p.m.	0.40	—
Mortlake[1]	YNE	145	Watts, Watts & Co., Ltd.	300, 600	P G	X	0.40	—
Morvada[1]	MUP	230	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Motagua[1]	MPN	230	Elders & Fyffes, Ltd.	300, 600	P G	X	0.40	—
Mottisfont[1]	YFL	170	Canadian Pacific Railway Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Mount Berwyn[1]	BBM	150	H. E. Moss & Co.	300, 600	P G	X	0.40	—
Mount Etna[1]	YNK	155	H. E. Moss & Co.	300, 600	P G	X	0.40	—
Mount Everest[1]	XLM	150	H. E. Moss & Co.	300, 600	P G	X	0.40	—
Mount Snowdon[1]	EZO	150	H. E. Moss & Co.	300, 600	P G	X	0.40	—
Mourino[1]	BNK	—	Ellerman's Wilson Line, Ltd.	300, 600	P G	9 a.m. to 1 p.m. 3 to 6 p.m. 8 to 11 p.m.	0.40	—
Mull[1]	GXM	130	B. J. Sutherland & Co., Ltd.	300, 600	P G	X	0.40	—
Mumbles Light[1]	YTD	150	German Bros.	300, 600	P G	X	0.40	—
Munardan[1]	GQP	180	Crossburn S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Muncaster Castle[1]	ZAX	160	J. Chambers & Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Muneric[1]	XIL	180	Clarke & Service	300, 600	P G	X	0.40	—
Munster[1]	MCQ	170	City of Dublin Steam Packet Co.	300, 600	P G	N	0.05	0.50
Murillo[1]	YTH	220	Lamport & Holt, Ltd.	300, 600	P G	N	0.40	—
Musician[1]	MAD	170	T. & J. Harrison	300, 600	P G	X	0.40	—
Mutlah[1]	MOA	145	James Nourse, Ltd.	300, 600	P G	X	0.40	—
Muttra[1]	GMJ	170	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Myrmidon[1]	ZKK	170	A. Holt & Co.	300, 600	P G	X	0.40	—
Mytilus[1]	ZKU	200	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Nagara[1]	LTZ	200	Royal Mail Steam Packets Meat Transports, Ltd.	300, 600	P G	X	0.40	—
Nagoya[1]	GCD	220	P. & O. S.N. Co.	300, 600	P G	X	0.40	—
Naimes[1]	GBLX	—	A. Weir & Co.	300, 600	P G	X	0.40	—
Naldera[1]	GCTZ	140	P. & O. S.N. Co.	300, 600	P G	N	0.40	—
Namsang[1]	YVJ	170	Indo-China S.N. Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Naneric [1]	GKO	190	A. Weir & Co.	300, **600**	P G	N	0.40	—	
Nankin [1]	GKP	200	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Nantwen [1]	YDO	105	Morgan & Cadogan, Ltd.	300, **600**	P G	X	0.40	—	
Napierian [1]	ZGS	170	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Nardana [1]	GCLF	200	British India S.N. Co., Ltd.	—	—	—	—	—	
Narva [1]	ODP	110	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.15	1.50	
Nascopie [1]	ZPC	180	Hudson's Bay Co.	300, **600**	P G	X	0.40	—	
Nasmyth [1]	GBPX	170	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Natica [1]	MZN	220	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Navahoe MEN [2]	MEN	200	Anglo-American Oil Co., Ltd.	300, **600**	P G	X	0.40	—	
Navarino [1]	ZTT	140	Glen & Co.	300, **600**	P G	X	0.40	—	
Navasota [1]	EJT	130	Royal Mail Steam Packets Meat Transports, Ltd.	300, **600**	P G	N	0.40	—	
Navigator [1]	EIH	180	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Nawab [1]	ZQT	170	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Neebing [1]	ODH	120	Silverdale S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Needwood [1]	EOZ	125	F. France, Fenwick & Co., Ltd.	300, **600**	P G	X	0.40	—	
Neko [1]	EOQ	180	Chr. Salvesen & Co.	300, **600**	P G	X	0.40	—	
Neleus [1]	ZKL	200	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Nellore [1]	MEW	220	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Nemesis MSM [2]	MSM	150	Lindsay, Swan & Hunter, Ltd.	300, **600**	P	X	—	—	
Neotsfield GCKS [1]	GCKS	—	J. Bell & Co.	—	—	—	—	—	
Nerbudda [1]	GBML	230	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Nessian [1]	GPV	160	F. Leyland & Co., Ltd.	300, **600**	P G	X	0.40	—	
Nestor GBQ [1]	GBQ	270	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Netherpark [1]	ZIO	250	J. Greenlees & Co.	300, **600**	—	X	0.40	—	
Neumark [1]	GBTZ	—	J. M. Campbell & Son	—	—	—	—	—	
Neuralia [1]	GCV	220	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Neva LTU [1]	LTU	130	W. H. Stott & Co., Ltd.	300, **600**	P G	X	0.40	—	
Nevasa [1]	GBG	250	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Nevisian [1]	EOG	160	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Newaster [1]	BMB	150	Aster Shipping Co.	300, **600**	P G	X	0.40	—	
Newbigging [1]	BGN	120	J. Mitchell & Sons	300, **600**	P G	X	0.40	—	
New Brunswick [1]	GBSW	180	Elder, Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Newby Hall [1]	ZOE	140	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
New Georgia [1]	GBSY	190	Elder, Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Newhaven ZCJ [6]	ZCJ	160	The Admiralty	300, 450, **600**	P G	N	—	—	
Newlands [1]	ZYO	140	T. Lewis	300, **600**	P G	X	0.40	—	

New Mexico GBSX[1]	GBSX	190	Elder, Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Newquay[1]	BDK	120	J. J. & C. M. Forster	300, 600	P G ..	X	0.40	—
New Texas[1]	GCLW	—	Elder, Dempster & Co., Ltd. ..	—	—	—	—	—
Newton GBTJ[1] ..	GBTJ	—	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
New Toronto[1]	GCLV	200	Elder Dempster & Co., Ltd. ..	—	—	—	—	—
New York City[1] ..	BQU	145	C. Hill & Sons	300, 600	P G ..	X	0.40	—
Ngakuta	BHP	—	Blackball Coal Co...	—	—	—	—	—
Niceto de Larrinaga[1]..	ZNS	170	Larrinaga & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Nicoya[1]	MLV	150	Elders & Fyffes, Ltd.	300, 600	P G ..	X	0.40	—
Nienburg[1]	GBYS	—	J. Chambers & Co.	300, 600	P G ..	X	0.40	—
Nile[1]	GCYV	—	Glen & Co.	—	—	—	—	—
Nilemede[1]	XJM	150	D. & T. G. Adams..	300, 600	P G ..	X	0.40	—
Ningchow[1]	YOV	200	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Ninian[1]..	MEB	170	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Ninive[1]	GCWP	—	British India S.N. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Nirvana[1]	MZW	270	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Nitokris[1]	GBZS	—	Pacific S.N. Co.	300, 600	P G ..	X	0.40	—
Nitonian[1]	YSD	170	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Nivose[1]..	YMX	150	Plisson S.S. Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Nizam	YBC	—	Asiatic S.N. Co., Ltd.	300, 600	P G ..	X	—	—
Noelle[1]	YLC	—	P. Samuel & Co., Ltd.	300, 600	P G ..	X	0.40	—
Nolisement[1]	GVO	130	R. E. Morel & Co...	300, 600	P G ..	X	0.40	—
Norburn[1]	XID	120	Coombes, Marshall & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Nore[1]	GKV	210	P. & O. S.N. Co.	300, 600	P G ..	X	0.40	—
Norfolk Range[1] ..	BUG	100	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Norman[1]	MOM	200	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	N	0.40	—
Normandier[1]	YBO	—	Lloyd Royal Belge (G. Brit.), Ltd.	300, 600	P G ..	X	0.40	—
Norman Monarch[1] ..	YQL	175	Raeburn & Vérel, Ltd.	300, 600	P G ..	X	0.40	—
Normannia GKW[1, 10]..	GKW	170	L. & S.W. Railway Co., Ltd. ..	300, 600	P G ..	N	0.15	1.50
Normannia GBLK[1] ..	GBLK	—	T. L. Duff & Co.	300, 600	P G ..	X	0.40	—
Norman Prince[1] ..	ZFV	145	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	8 a.m. to 12 n. 2 to 3 p.m. 6 p.m. to 12 midnight	0.40	—
Normanstar[1]	ZXR	—	Blue Star Line, Ltd.	—	—	—	—	—
Norriston[1]	ZBY	120	W. S. Miller & Co.	300, 600	P G ..	X	0.40	—
Norseman MEG[8] ..	MEG	140	Western Telegraph Co.	300, 600	P ..	—	—	—
North Britain[1] ..	ETQ	140	H. Roberts & Son	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Northern[1]	BCV	—	J. Mathias & Sons..	300, 600	P G ..	—	0.40	—
North Pacific[1].. ..	ZSK	170	G. E. Ambatielas	300, 600	P G ..	X	0.40	—
Northland YYF[1] ..	YYF	200	International Nav. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
North Point[1]	GIW	170	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
North Sands[1]	GOU	145	Union Chartering Co.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Northumberland [1]	ZBL	180	Federal S.N. Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
North Western Miller [1]	MTV	200	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Norton [1]	OEH	140	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Nortonian [1]	MEO	170	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Norwich City [1]	EXB	145	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Notanda [1]	XFZ	100	Morgan & Cadogan	300, **600**	P G	X	0.40	—	
Notts [3]	ZCO	—	Great Central Railway	300, 500, **600**	P R	X	0.10	1.00	
Novara [1]	GCW	200	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Novgorod [1]	ZOG	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Novian [1]	YPG	170	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Novington [1]	ELM	—	Bell, Symondson & Co.	300, **600**	P G	X	0.40	—	
Novo [1]	OCK	100	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.15	1.50	
Nowshera [1]	ENQ	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Nubian ZGO [1]	ZGO	170	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Nucula [1]	BHL	170	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Nuddea [1]	GBTW	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Nurtureton [1]	ZVH	130	A. Mackenzie	300, **600**	P G	X	0.40	—	
Nyanza GKY [1]	GKY	210	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Oak Branch [1]	ETC	170	F. & W. Ritson	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Oakfield [1]	MXF	140	Craggs S.S. Co.	300, **600**	P G	X	0.40	—	
Oaklands Grange [1]	ZEQ	140	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Oakmore [1]	BOP	110	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Oakwin [1]	XLD	155	Ashwin & Co.	300, **600**	P G	X	0.40	—	
Oanfa [1]	GTL	200	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Obra [1]	GML	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ocean Monarch [1]	EXR	150	Raeburn & Vérel, Ltd.	300, **600**	P G	X	0.40	—	

Ocean Transport [1] ..	ZDZ	140	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Oehringen [1]	GBPF	150	Lyle Shpg. Co., Ltd.	300, 600	P G ..	X	0.40	—
Okara [1]	GMW	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Oliva [1]	ZLO	210	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Olympia MHI [1] ..	MHI	175	Henderson Bros.	300, 600	P G ..	X	0.40	—
Olympic [1]	MKC	400	White Star Line	300, 600	P G ..	N	0.40	—
Olympos [1]	GBNS	—	Thos. Law & Co.	300, 600	P G ..	X	0.40	—
Onda [1]	GNL	200	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Onega [1]	GCFD	—	Wm. Thompson & Co.	—	—	—	—	—
Oneka [2]	GTV	125	Standard Transportant Co., Ltd...	300, 600	P ..	X	—	—
Onitsha [1]	ZMM	175	Elder, Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Onward [2]	GUM	50	S.E. & Chatham Railway Co.'s Mng. Committee	300, 600	P G ..	N	0.15	1.50
Oolobaria [1]	GNU	200	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Opawa [1]	MRG	220	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Ophir GYB [1]	GYB	200	Orient S.S. Co.	300, 600	P G ..	X	0.40	—
Orangeleaf [1]	ZZP	210	Lane & Macandrew, Ltd... ..	300, 600	P G ..	X	0.40	—
Orangemoor [1]	YIL	145	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Orange River [1].. ..	ZEM	160	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Oranian [1]	ZGU	175	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Orari [1]	MRM	240	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Orator [1]..	YNB	220	T. & J. Harrison	300, 600	P G ..	X	—	—
Orbita [1]..	MGI	240	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Orca [1]	MGO	240	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Orcoma [1]	MJF	280	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Orduna [1]	MGP	280	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Oreland [1]	BAS	140	Humphries, Cardiff	300, 600	P G ..	X	0.40	—
Orestes [1]	YTN	175	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Oriana [1]	MJJ	230	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Orient City [1]	ZUN	150	W. R. Smith & Sons	300, 600	P G ..	X	0.40	—
Orissa GNW [1] ..	GNW	210	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Oristano [1]	ZFL	160	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Orita [1]	MJG	230	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Ormara [1]	MVD	230	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Ormonde [1]	BNC	280	Orient S.N. Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Orna [1]	GNY	220	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Orontes [1]	MOZ	220	Orient S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Orotava [1]	GUD	220	The Admiralty	300, 600	P G ..	N	0.40	—
Orsova [1]	MOF	280	Orient S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Ortega [1]	MJK	220	Pacific S.N. Co.	300, 600	P G ..	N	0.40	—
Orteric [1]	GBJW	—	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Orthia [1]	YYT	160	Donaldson Bros.	300, 600	P G ..	N	0.40	—
Orvieto [1]	MOJ	250	Orient Line	300, 600	P G ..	X	0.40	—
Osiris [1]	GAQ	155	P. & O. S.N. Co.	300, 600	P G ..	X	0.40	—
Osterley [1]	MOY	250	Orient S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Othello [1]	YNT	240	Ellerman's Wilson Line, Ltd.	300, **600**	P G	9 a.m. to 1 p.m. 3 to 6 p.m. 8 to 11 p.m.	0.40	—	
Otira [1]	XFD	180	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Ottawa [1]	MIV	180	J. Hamilton	300, **600**	P G	X	0.40	—	
Otto Kalthoff	GBYV	—	Andrew Crawford & Co.	300, **600**	P G	X	0.40	—	
Overdale [1]	BUY	145	Chr. Salvesen & Co.	300, **600**	P G	X	0.40	—	
Oweenee [1]	YLB	135	Anglo-Saxon Pet. Co., Ltd.	300, **600**	P G	X	0.40	—	
Oxfordshire [1]	MYE	210	Bibby Bros.	300, **600**	P G	X	0.40	—	
Oxonian [1]	MHR	190	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Oyleric [1]	YPE	190	A. Weir & Co.	300, **600**	P G	N	0.40	—	
Ozarda [1]	GNZ	140	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Pacific Transport [1]	ZED	145	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Pacuare [1]	MLY	150	Elders & Fyffes, Ltd.	300, **600**	P G	X	0.40	—	
Pakeha [1]	GLG	250	Shaw, Saville & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Pak Ling [1]	ZJN	170	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Palamcotta [1]	BSP	230	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Palermo [1]	MIL	180	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Palitana [1]	ZSQ	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Palma MKD [1]	MKD	170	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Palma YMG [1]	YMG	155	Elder, Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Palm Branch [1]	EWG	175	F. & W. Ritson	300, **600**	P G	X	0.40	—	
Panama MWB [1]	MWB	170	Pacific S.N. Co.	300, **600**	P G	N	0.40	—	
Panama Transport [1]	ZDV	160	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Panayiotis [1]	YXM	125	Grahams & Co.	300, **600**	P G	X	0.40	—	
Pancras [1]	MDI	155	Booth S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Pangani [1]	GBZN	150	Glen Line, Ltd.	300, **600**	P G	X	0.40	—	
Pangbourne [1]	OCL	150	J. Power & Co.	300, **600**	P G	X	0.40	—	
Pannonia [1]	MNA	250	Cunard S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Paparoa [1]	MHY	230	New Zealand Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Parana [1]	GLK	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Parattah	VKU	—	Req. by Australian Commonwealth	—	—	—	—	—	
Pardo [1]	GLL	150	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Paris GLC [3]	GLC	120	L.B. & S.C. Railway Co.	300, **600**	P G	N	0.15	1.50	
Parktown [1]	ZYF	150	Maclay & MacIntyre	300, **600**	P G	X	0.40	—	
Parthenia [1]	ZXJ	170	Donaldson Line, Ltd.	300, **600**	P G	X	0.40	—	
Pasha [1]	MZZ	200	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	

Patani[1]	ZIL	200	Elder, Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Patella[1]	MZO	170	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Pathan[1]	MPV	140	Gellatly, Hankey & Co.	300, 600	P G ..	X	0.40	—
Patmos[1]	GBZF	—	James Cormack & Co.	300, 600	P G ..	X	0.40	—
Patricia[1]	GBZP	—	Ellerman Lines, Ltd.	300, 600	P G ..	X	0.40	—
Patrician[1]	BDI	140	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Patriotic[1]	LSM	150	Belfast S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Patrol[2]	MBM	140	E. Extension Austr. & China Tel. Co., Ltd.	300, 600	P ..	—	0.40	—
Patuca[1]	GDB	200	Elders & Fyffes, Ltd.	300, 600	P G ..	X	0.40	—
Paul Paix[1]	YGP	145	J. M. Lennard & Sons, Ltd. ..	300, 600	P G ..	X	0.40	—
Pavia[1]	ZZV	170	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Pearleaf[1]	ZZO	210	Lane & MacAndrew, Ltd. ..	300, 600	P G ..	X	0.40	—
Pearlmoor[1]	YIM	145	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Peebles[1]	ODB	145	Sutherland S.S. Co., Ltd... ..	300, 600	P G ..	X	0.40	—
Peleus[1]	YPO	240	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Pembroke[2]	BDT	—	Great Western Railway Co. ..	300, 600	P G ..	N	0.40	—
Pembrokeshire[1] ..	MUT	200	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Penare[1]	YFM	110	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pencisely[1]	BNY	140	Hopkins, Sanders & Co.	300, 600	P G ..	X	0.40	—
Pendarves[1]	YHB	150	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pendeen[1]	XFI	135	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pendragon Castle[1] ..	ZZF	150	J. Chambers & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Pengelly[1]	YLX	120	Pencisely Shipping Co.	300, 600	P G ..	X	0.40	—
Pengreep[1]	EWR	110	R. B. Chellew	300, 600	P G ..	X	0.40	—
Penmorvah[1]	ZXN	200	R. B. Chellew	300, 600	P G ..	X	0.40	—
Penmount[1]	XFH	125	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pennard[1]	ZZC	150	Pennard S.S. Co.	300, 600	P G ..	X	0.40	—
Pennyworth[1]	ZPL	180	R. S. Dalgliesh	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Penolver[1]	YXT	170	R. B. Chellew	300, 600	P G ..	X	0.40	—
Penrhos[1]	YKW	145	Richard S.S. Co.	300, 600	P G ..	X	0.40	—
Penrhydd[1]	EXY	140	Ferrier & Rees	300, 600	P G ..	X	0.40	—
Penrhys[1]	MHX	—	Ferrier & Rees	300, 600	P G ..	X	0.40	—
Penrose[1]	ZWU	155	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pensacola OED[1] ..	OED	120	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Pensilva[1]	YMZ	140	R. B. Chellew	300, 600	P G ..	X	0.40	—
Pentakota[1]	ZSN	170	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Pentaur..	GOV	180	Chr. Salvesen & Co., of Leith ..	300, 600	P G ..	X	0.40	—
Pera[1]	GBCY	—	Bell, Symondson & Co.	300, 600	P G ..	X	0.40	—
Perez[1]	BQZ	130	British Hispano Line, Ltd. ..	300, 600	P G ..	X	0.40	—

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Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Persian Prince[1]	XIZ	150	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Persic[1]	MQC	250	White Star Line	300, **600**	P G	X	0.40	—	
Perth[1]	EWC	130	Dundee, Perth & London Shipping Co.	300, **600**	P G	X	0.05	0.50	
Perthshire[3]	GQB	220	The Admiralty	300, 450, **600**	P G	9 a.m. to 12.30 p.m. 1 to [illegible] p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—	
Peru GLN[1]	GLN	220	Pacific S.N. Co.	300, **600**	P G	N	0.40	—	
Peshawar[1]	GCBS	165	P. & O. S.N. Co.	300, **600**	P G	X	0.40	—	
Petersham[1]	ETZ	160	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	
Peterton[1]	YGV	—	R. Chapman & Son	300, **600**	P G	X	0.40	—	
Petingaudet[1]	BFW	170	Leopold Walford (London), Ltd.	300, **600**	P G	X	0.40	—	
Petrograd[1]	BUF	105	W. Thompson & Co.	300, **600**	P G	X	0.40	—	
Petroleine[1]	ZYK	160	Hunting & Son	300, **600**	P G	X	0.40	—	
Petworth[1]	XIH	150	J. Power & Co.	300, **600**	P G	X	0.40	—	
Peveril[1]	XKK	130	C. A. Stewart & Co.	300, **600**	P G	X	0.40	—	
Phidias[1]	YOT	200	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Phoebe[1]	OCN	140	Frew, Elder & Co.	300, **600**	P G	X	0.40	—	
Phrygia[1]	EST	170	Cunard S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Physa[1]	EVW	190	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Pecton[1]	YFA	—	E. T. Radcliffe & Co.	300, **600**	P G	X	0.40	—	
Pikepool[1]	YLV	140	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Pilar de Larrinaga[1]	BHF	—	Larrinaga S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Pilton[1]	GDBP	135	Lord Glanely	—	—	—	—	—	
Pinemore[1]	ZJO	135	Furness, Withy & Co. Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Pinewin[1]	GBX	150	Ashwin & Co.	300, **600**	P G	X	0.40	—	
Pinnau[1]	GBPY	—	Gellatly, Hankey & Co.	300, **600**	P G	X	0.40	—	
Pionier[1]	GBFJ	—	J. M. Campbell & Son	300, **600**	P G	X	0.40	—	
Plassy[1]	MNJ	250	P. & O. S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Plauen[1]	GBND	—	Watts, Watts & Co., Ltd.	300, **600**	P G	X	0.40	—	

Plumleaf[1]	ZZM	210	Lane & MacAndrew, Ltd. ..	300, 600	P G ..	X	0.40	—	
Plutarch[1]	ZIB	155	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—	
Polbain[1]	BLH	170	Coast Lines, Ltd.	300, 600	P G ..	X	0.40	—	
Polcrest[1]	BOH	135	L. Lougher & Co.	300, 600	P G ..	X	0.40	—	
Poldennis[1]	BFY	—	Fisher, Alimonda & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Poleric[1]	GCY	210	A. Weir & Co.	300, 600	P G ..	N	0.40	—	
Polglass Castle[1] ..	ZTA	160	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—	
Polgowan	ZIZ	—	A. W. Pickard & Co.	300, 600	—	X	—	—	
Policastria[1]	ZAF	170	A. W. Pickard & Co.	300, 600	—	X	0.40	—	
Polish Monarch[1] ..	EJC	145	Raeburn & Verel, Ltd.	300, 600	P G ..	X	0.40	—	
Politician[1]	MVZ	155	T. & J. Harrison	300, 600	P G ..	X	0.40	—	
Polladern[1]	ZMH	220	J. Herron & Co.	300, 600	—	X	0.40	—	
Pollensa[1]	XHS	145	J. Cory & Sons, Ltd.	300, 600	P G ..	X	0.40	—	
Polo[1]	GBNJ	125	Ellerman's Wilson Lines, Ltd. ..	300, 600	P G ..	X	0.40	—	
Polperro[1]	BFZ	150	Fisher Alimonda & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Polshannon[1]	XUK	230	Anglo-Saxon Petro. Co., Ltd. ..	300 600	P G ..	X	0.40	—	
Poltolia[1]	ZWA	—	Anning Bros.	300, 600	P G ..	X	—	—	
Polycarp[1]	XIE	140	Booth S.S. Co., Ltd	300, 600	P G ..	X	0.40	—	
Polyphemus[1]	YSZ	170	A. Holt & Co.	300, 600	P G ..	X	0.40	—	
Pomaron[1]	OEI	125	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Pontwen[1]	YDR	—	S. Instone & Co., Ltd.	300, 600	P G ..	X	0.40	—	
Poona[1]	MSO	190	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—	
Poplar Branch[1] ..	YPF	160	F. & W. Ritson	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Portfield[1]	GCBF	170	W. E. Hinde & Co.	300, 600	P G ..	X	0.40	—	
Port Adelaide[1] ..	GCNR	220	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Albany[2]	GWI	260	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Alma[1]	EQB	180	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Augusta[1] ..	EPN	150	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Bowen[1]	XHP	210	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Caroline[1] ..	XHQ	220	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Chalmers[1] ..	EJW	220	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Darwin[1]	YGL	150	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	
Port Denison[1] ..	YGM	150	Commonwealth & Dominion Line, Ltd.	300, 600	P G ..	X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Port Elliot [1]	ZLT	155	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Hacking [1]	EIP	200	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Portinglis [1]	MXN	—	Furness, Withy & Co., Ltd.	300, **600** [4]	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Port Lincoln [3]	GTZ	260	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	N	0.40	—	
Portloe [1]	EKN	145	W. E. Hinde & Co.	300, **600**	P G	X	0.40	—	
Port Lyttelton [1]	ZPD	200	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Macquarrie [3]	GSB	260	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	N	0.40	—	
Port Melbourne [1]	ZSW	210	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Napier [3]	ZNZ	180	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Nicholson [1]	XHO	200	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Phillip [1]	EPO	160	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Port Pirie [1]	ZSV	200	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	—	—	
Portreath [1]	MXX	140	Portloe S.S. Co.	300, **600**	P G	X	0.40	—	
Portrushton [1]	YPW	145	R. McNeil & Sons	300, **600**	P G	X	—	—	
Portsea [1]	YQH	135	W. Brown, Atkinson & Co., Ltd.	300, **600**	P G	X	0.40	—	
Port Stephens [1]	ZSU	230	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	—	—	
Port Sydney [1]	ZLU	220	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	N	0.40	—	
Port Victor [1]	EQD	250	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Portuguese Prince [1]	GRS	200	Furness, Withy & Co., Ltd.	300, **600**	P G	N	0.40	—	
Porta	GBTN	—	Lamport & Holt	300, **600**	P G	X	0.40	—	
Potomac GLQ [1]	GLQ	145	J. Hamilton	300, **600**	P G	X	0.40	—	
Potosi [1]	MII	170	Pacific S.N. Co., Ltd.	300, **600**	P G	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—	

Prah[1]	BRW	220	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Prahsu[1]	ZMB	200	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Prairial[1]	BAM	155	Plesson S.N. Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Pretoria GCYB[1] ..	GCYB	—	Ellermans Lines, Ltd.	300, 600	P G ..	X	0.40	—
Pretorian[1]	MFN	200	Canadian Pacific Ocean Services, Ltd.	300, 600	P G ..	N	0.40	—
Priam[1]	YTO	200	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Priestfield[1]	BDQ	—	A. M. Sutherland	300, 600	P G ..	X	0.40	—
Prince George GLR[17] ..	GLR	150	Grand Trunk Pacific Development Co., Ltd.	300, 600	P G ..	N	0.40	—
Prince Rupert[17] ..	GLS	150	C. H. Nicholson	300, 600	P G ..	N	0.40	—
Princesa[1]	ZQE	150	Furness-Houlder Argentine Line, Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Princess[1]	BJX	—	Ellerman & Bucknall S.S. Co., Ltd.	300, 600	P G ..	X	—	—
Princess Maud[1] ..	YXR	—	W. McConchie	300, 600	P G ..	X	0.40	—
Princess Victoria MCM[1]	MCM	250	Canadian Pacific Railway Co. ..	300, 600	P G ..	N	0.40	4.00
Princess Victoria ZTF[1]	ZTF	—	Port Patrick & Wigtownshire Railway Joint Commissioners	300, 600	P G ..	X	0.40	—
Prinzessin[1]	GBDT	—	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Prinz Friedrich Wilhelm	GCNV	—	White Star Line	300, 600	P G ..	X	0.40	—
Prinz Hubertus[1] ..	GBMK	—	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Prinz Ludwig[1]	GBKL	—	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	—	—
Professor EMS[1] ..	EMS	160	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Professor BRY[1] ..	BRY	250	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	—	—
Prometheus[1]	YTA	180	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Promus[1]	OCZ	150	W. H. Seager & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Protesilaus[1]	GSC	90	A. Holt & Co.	300, 450, 600	P G ..	X	0.40	—
Pruth[1]	EUU	145	E. Hain & Son	300, 600	P G ..	X	0.40	—
Pundit OCO[1]	OCO	—	Asiatic S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Pundua[1]	ZSP	—	Bitish India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Purfleet Belle[1]	YLP	120	Cunningham, Shaw & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Purnea[1]	BSQ	225	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	—	—
Putney[1]	YKQ	135	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Pyrgos[1]	GBNT	—	Easton Greig & Co.	300, 600	P G ..	X	0.40	—
Pyrrhus[1]	YOY	220	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Quantock[1]	ZJF	—	Mediterranean Cargo Steamers ..	300, 600	P G ..	X	0.40	—
Queda[1]	GOA	200	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Queen Alexander ELN[1]	ELN	130	Chas. Cravos & Co.	300, 600	P G ..	X	0.40	—
Queen Elizabeth[1] ..	EVN	160	Edward Sons & Co.	300, 600	P G ..	X	0.40	—
Queen Helena[1] ..	YBH	—	T. Dunlop & Sons	300, 600	P G ..	X	0.40	—
Queen Louise[1] ..	EUW	170	T. Dunlop & Sons	300, 600	P G ..	X	0.40	—
Queen Margaret[1] ..	ZRW	160	T. Dunlop & Sons	300, 600	P G ..	X	0.40	—
Queen Maud[1]	EVB	155	Union Chartering Co.	300, 600	P G ..	X	0.40	—
Queenmoor[1]	EQL	140	W. Runciman & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Queensgarth[1]	ZBZ	145	R. & J. H. Rea	300, 600	P G ..	X	0.40	—
Queensland[1]	EJE	175	R. M. Hudson & Sons	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Queensland Transport [1]	ZEA	190	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Quentin [1]	ZOV	120	G. Gibson & Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Querimba [1]	GOB	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Quillota [1]	MWK	200	Pacific S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Quiloa [1]	GOC	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Quilpue [1]	GLT	200	Pacific S.N. Co., Ltd.	300, **600**	P G	N	0.40	—	
Quito [1]	ZWF	150	T. Lewis	300, **600**	P G	X	0.40	—	
Rabymere [1]	EVC	140	H. R. Greenhalgh	300, **600**	P G	X	0.40	—	
Racia [1]	ZZU	—	J. S. Watkins	300, **600**	P G	X	0.40	—	
Radnorshire [1]	GBQX	190	Royal Mail Steam Packet Co., Ltd.	300, **600**	P G	N	0.40	—	
Raeburn [1]	MES	190	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Raithwaite [1]	MNX	140	E. J. Leslie	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Rajah XKP [1]	XKP	200	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Rajput [1]	XMU	200	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ramore Head [1]	YSG	200	G. Heyn & Sons	300, **600**	P G	X	0.40	—	
Ramos [3]	GLU	140	Amazon Telegraph Co., Ltd.	300, **600**	P	—	—	—	
Ranee XKO [1]	XKO	200	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ranella [1]	MZP	190	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ranger MLD [3]	MLD	150	Liverpool Salvage Association	300, **600**	P	X	0.05	0.50	
Raphael [1]	MET	175	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Rapidan [1]	EQV	180	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Raranga [1]	ZNI	200	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Rathlin Head [1]	ZAR	150	G. Heyn & Sons	300, **600**	P G	X	0.40	—	
Rathmore [3]	GUT	250	L. & N.W. Railway Co.	300, **600**	P G	N	0.05	0.50	
Rassay [1]	MGR	140	B. J. Sutherland	300, **600**	P G	X	0.40	—	
Ravelston [1]	YGY	135	Gillespie & Nicol	300, **600**	P G	X	0.40	—	
Raven LTN [3]	LTN	—	General S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ravenorck [1]	GCSY	135	The Admiralty	300, **600**	P G	X	0.40	—	
Ravenspoint [1]	XFF	135	J. Glynn & Sons, Ltd.	300, **600**	P G	X	0.40	—	
Ravenstone [1]	BRZ	145	Chr. Salvesen & Co.	300, **600**	P G	X	0.40	—	
Ravensworth [1]	GBJN	170	R. S. Dalgliesh	300, **600**	P G	X	0.40	—	
Reading [1]	EXK	145	J. Cory & Sons, Ltd.	300, **600**	P G	X	0.40	—	

Recorder [8]	MEJ	140	E. Extension Australian & China Tel. Co., Ltd.	300, 600	P ..	—	0.40	—
Redbridge [1]	YHQ	155	J. Temperley & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Red Cap [1]	ZRG	130	J. Good & Sons, Ltd.	300, 600	P G ..	X	0.40	—
Redruth [1]	XMC	150	J. Cory & Sons, Ltd.	300, 600	P G ..	X	0.40	—
Regent [1]	EZQ	145	J. Westoll	300, 600	P G ..	X	0.40	—
Regina GBCT [1] ..	GBCT	160	J. & A. Roxburgh	300, 600	P G ..	X	—	—
Regina ZOD [1]	ZOD	—	British & North Atlantic S.N. Co., Ltd.	300, 600	P G ..	X	—	—
Reindeer MSD [8] ..	MSD	120	Great Western Railway Co. ..	300, 600	P G ..	N	0.05	0.50
Reindeer ZRN [1]	ZRN	—	Jackson Bros. & Cory	300, 600	P G ..	X	0.40	—
Relentless [1] ..	XHN	110	Radcliffe Thomas & Gaunt ..	300, 600	P G ..	X	0.40	—
Relillio [1]	XLZ	140	Orders & Hanford S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Rembrandt MEU [1] ..	MEU	160	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Remuera [1]	MKV	250	New Zealand S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Renfrew [1]	BFL	125	Sutherland S.S. Co.	300, 600	P G ..	X	0.40	—
Reresby [1]	MMC	145	C. Radcliffe & Co.	300, 600	P G ..	X	0.40	—
Reval [1]	BEB	120	W. Thomson & Co.	300, 600	P G ..	X	0.40	—
Rexmore [1]	XHY	150	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Rheinfels [1]	YDH	—	Grahams & Co.	—	—	X	—	—
Rhenania [1]	GBMC	—	Turnbull Scott & Co.	300, 600	P G ..	X	0.40	—
Rhesus [1]	ZII	250	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Rhio [1]	YHW	135	Orders & Handford S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Rhode Island BUX [1] ..	BUX	150	G. Warren & Co., Ltd., Liv. ..	300, 600	P G ..	X	0.40	—
Rhodesian Transport [1]	ZGB	160	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Ridley [1]	BGL	150	Stephens, Sutton & Stephens ..	300, 600	P G ..	X	0.40	—
Rimouski [1]	GIZ	230	British & North Atlantic S.N. Co., Ltd.	300, 600	P G ..	N	0.40	—
Rimutaka [1]	MBT	230	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Rio Blanco [1]	YXN	170	Petersen & Co., Ltd.	300, 600	P G ..	X	0.40	—
Rio Negro [1]	GBDW	—	Orient S.N. Co., Ltd.	300, 600	P G ..	X	—	—
Rio Pardo [1]	GBDQ	—	Orient S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Rio Preto [1]	BAW	160	T. Lewis & Co.	300, 600	P G ..	X	0.40	—
Rion [1]	XJI	140	Petroleum S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Riposto [1]	GCNK	140	J. Glynn & Sons	—	—	—	—	—
Risalder [1]	MTE	180	Asiatic S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
River Araxes [13] ..	ZIT	—	Stanley M. Thompson	300, 600	P G ..	X	—	—
River Orontes [1] ..	EVD	150	Stanley M. Thompson	300, 600	P G ..	X	0.40	—
Riverton BNE [1] ..	BNE	120	R. Chapman & Son	300, 600	P G ..	X	0.40	—
Riviera [8]	GUO	50	S.E. & Chatham Railway Co.'s Mng. Comm.	300, 600	P G ..	N	0.15	1.50
Roath [1]	ZRJ	170	J. Cory & Sons, Ltd.	300, 600	P G ..	X	0.40	—
Rochdale [1]	BGU	145	C. Radcliffe & Co.	300, 600	P G ..	X	0.40	—
Rocio [1]	ENC	175	Orders & Handford S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Roda	GBDP	—	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Roker [1]	BSO	150	J. Westoll	300, 600	P G ..	X	—	—
Roma ESW [1]	ESW	170	Headlam & Rowland	300, 600	P G ..	X	0.40	—
Roma GBMW [1] ..	GBMW	—	O. & W. Williams	300, 600	P G ..	X	0.40	—
Roman Prince [1] ..	ZGI	120	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radiotelegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Romeo [1]	ZOP	220	Hall Line, Ltd.	300, **600**	P G ..	X	—	—	
Romera	YVI	—	Maclay & McIntyre	—	—	—	—	—	
Romney MEV ..	MEV	170	Lamport & Holt, Ltd.	300, **600**	P G ..	X	0.40	—	
Romney YKP [1] ..	YKP	—	Franco-British S.S. Co.	300, **600**	P G ..	X	—	—	
Rona [1]	VXQ	—	Colonial Sugar Refining Co., Ltd.	—	—	—	—	—	
Ronan [1]	BQE	145	G. Gibson & Co., Ltd.	300, **600**	P G ..	X	0.05	0·50	
Rondo [1]	OCS	130	Pelton S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Rooke	GAG	130	F. C. Strick & Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Roquelle [1]	XMV	150	Elder Dempster & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Rosalind [1]	ZFA	150	New York, Newfoundland & Halifax S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Rose Castle [1]	YWV	170	T. Lewis	300, **600**	P G ..	X	0.40	—	
Roseden [1]	YGE	120	Stephens, Sutton & Stephens ..	300, **600**	P G ..	X	0.40	—	
Rosefield [1]	BND	135	Woods, Tylor & Brown	300, **600**	P G ..	X	0.40	—	
Roselands [1]	YCB	150	L. Boydgedes	300, **600**	P G ..	X	0.40	—	
Roseleaf [1]	EQC	190	British Tanker Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Roseric [1]	GLY	250	A. Weir & Co.	300, **600**	P G ..	N	0.40	—	
Roseworth [1]	GCZX	—	R. S. Dalgliesh	—	—	—	—	—	
Rossall [1]	GBTV	145	James McKelvie & Co.	300, **600**	P G ..	X	0.40	—	
Rossano [1]	ZFM	200	Gulf Line, Ltd.	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Rossetti [1]	MEY	175	Lamport & Holt, Ltd.	300, **600**	P G ..	X	0.40	—	
Rossia [1]	YDI	180	H. E. Moss & Co.	300, **600**	P G ..	X	0.40	—	
Rosstrevor [2]	YWB	135	L. & N.W. Railway Co.	300, **600**	P G ..	N	0.05	0.50	
Rotenfels [1]	EQY	—	Grahams & Co.	300, **600**	—	X	—	—	
Rothley [1]	EPE	125	Stephens, Sutton & Stephens ..	300, **600**	P G ..	X	0.40	—	
Rotterdam ZOS [1] ..	ZOS	120	Rankine Line, Ltd.	300, **600**	P G ..	X	0.05	0.50	
Rouen XEI [1]	XEI	130	Furness, Withy & Co., Ltd. ..	300, **600**	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Roulers [2]	GPL	130	Great Eastern Railway Co. ..	300, 450, **600**	P R ..	N	0.10	1.00	
Roumelian [1]	ZPG	145	Graham, Smith	300, **600**	P G ..	X	0.40	—	
Rounton [1]	XFJ	130	Hansen Bros., Ltd.	300, **600**	P G ..	X	0.40	—	
Rounton Grange [1] ..	ZER	140	Houlder Bros & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Royal George [1]	ZRY	—	Cunard S.S. Co., Ltd.	300, **600**	P G ..	N	0.40	—	

Royal Prince[1] ..	YJI	160	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Royal Sceptre[1] ..	BFE	140	Leopold, Walford & Co.	300, 600	P G ..	X	0.40	—
Royal Scot	ZTJ	—	London & Edinburgh Shipping Co.	300, 600	P G ..	X	—	—
Royalster[1]	ZRZ	150	Blue Star Line, Ltd.	300, 600	P G ..	X	0.40	—
Royal Transport ..	ZAE	—	Houlder Bros. & Co., Ltd. ..	—	—	—	—	—
Royston Grange[1] ..	GLZ	150	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Ruahine[1]	MKA	200	New Zealand Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Ruapehu[1]	MKB	250	New Zealand Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Rubiera[1]	ZXP	180	Blue Star Line, Ltd.	300, 600	P G ..	X	0.40	—
Rudelsburg[1]	GBJQ	—	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Rugia[1]	GBTL	—	Union-Castle Mail S.S. Co. ..	300, 600	P G ..	X	0.40	—
Runic[1]	MWC	250	White Star Line, Ltd.	300, 600	P G ..	X	0.40	—
Rumney[1]	EPJ	135	Rumney S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Ryburn[1]	XHX	145	Chas. Lowe & Partners, Ltd. ..	300, 600	P G ..	X	0.40	—
Ryde[1]	BSN	170	Headlam & Rowland	300, 600	P G ..	X	0.40	—
Saba[1]	YAF	170	Scrutton Sons & Co.	300, 600	P G ..	X	0.40	—
Sabine ERF[1]	ERF	—	Union-Castle Mail S.S. Co., Ltd. ..	300, 600	P G ..	N	0.40	—
Sachem MOL[1]	MOL	175	G. Warren & Co. (Liverpool) ..	300, 600	P G ..	X	0.40	—
Sagama River[1] ..	ZEK	160	Houlder Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Sagua LTP[1]	LTP	180	Houlder, Middleton & Co., Ltd.	300, 600	P G ..	X	0.40	—
Sahara MFX[1]	MFX	180	St. David S.N. Co.	300, 600	P G ..	X	0.40	—
Sakkarah[1]	GBSN	—	Bell Symondson & Co.	300, 600	P G ..	X	0.40	—
Salacia[1]	YIV	—	Donaldson Bros., Ltd.	300, 600	P G ..	X	0.40	—
Salaga[1]	ZMU	160	Elder Dempster & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Salerno[1]	EUR	170	Gulf Line, Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Salient[1]	EKR	140	J. Westoll	300, 600	P G ..	X	0.40	—
Sallust[1]	ZQH.	155	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Salvador[1]	ZBV	130	Pacific S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Sambre[1]	GCDV	—	Royal Mail Steam Packet Co. ..	—	—	—	—	—
Samnanger[1]	XXC	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Samp n[3]	EQN	—	Denaby & Cadeby Main Collieries, Ltd.	300, 600	P G ..	X	0.40	—
Sanday[1]	ZRM	—	A. M. Sutherland	300, 600	P G ..	X	0.40	—
Sangola[1]	GOD	175	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Santeramo[1]	ZGH	—	Gulf Line, Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Santhia[1]	GOE	175	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Santille[1]	BFK	175	Scrutton Sons & Co.	300, 600	P G ..	X	0.40	—
Sapphire[1]	MHK	200	Lord Furness	300, 600	P ..	X	—	—
Saranac EYG[1] ..	EYG	145	J. Hamilton	300, 600	P G ..	X	0.40	—
Sardinia[1]	GMB	220	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Sardinian[1]	MDN	200	Canadian Pacific Ocean Services, Ltd.	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Sargasso[1]	GXD	175	Scrutton Sons & Co.	300, **600**	P G	X	0.40	—	
Saskatoon[1]	BPC	—	Canadian Maritime Co., Ltd.	300, **600**	P G	X	0.40	—	
Satanta[1]	GTG	125	Standard Transportation Co., Ltd.	300, **600**	P	X	—	—	
Saturnia[1]	MBF	250	Donaldson Bros., Ltd.	300, **600**	P G	N	0.40	—	
Sausenburg[1]	GBNF	—	J. M. Campbell & Sons	300, **600**	P G	X	0.40	—	
Savan[1]	LTG	200	Scrutton Sons & Co.	300, **600**	P G	X	0.40	—	
Saxilby[1]	ELW	145	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Saxoleine[1]	LTX	150	Hunting & Son	300, **600**	P G	X	0.40	—	
Saxon MQI[1]	MQI	200	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Saxonia[1]	MSA	230	Cunard S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Scaldier[1]	EXI	140	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	0.40	—	
Scandinavian[1]	MNC	—	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	N	0.40	—	
Scarlet Tower[1]	YWS	135	Limerick S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Scarpa[1]	BUI	145	A. M. Sutherland	300, **600**	P G	X	0.40	—	
Scatwell[1]	YEQ	140	W. H. Seager & Co.	300, **600**	P G	X	0.40	—	
Schil Iturm[1]	GBRW	—	Turnbull Scott & Co.	300, **600**	P G	X	0.40	—	
Schwarzenfelde[1]	GBVL	—	Gow, Harrison & Co.	300, **600**	P G	X	0.40	—	
Schwaben[1]	GBQL	—	F. C. Strick & Co.	300, **600**	P G	X	0.40	—	
Schwarzenfels[1]	GBKZ	—	Macvicar Marshall & Co., Ltd.	300, **600**	P G	X	0.40	—	
Schwinge[1]	GBKX	—	James Gardiner & Co.	300, **600**	P G	X	0.40	—	
Scindia[1]	MHJ	175	Henderson Bros.	300, **600**	P G	X	0.40	—	
Scipio[1]	ODR	115	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Scotia GBJZ[1]	GBJZ	—	Hall Bros.	300, **600**	P G	X	0.40	—	
Scotia GRR[3]	GRR	170	L. & N.W. Railway	300, **600**	P G	N	0.05	0.50	
Scotian[1]	MJN	200	Canadian Pacific Ocean Services, Ltd.	300, **600**	P G	N	0.40	—	
Scottier[1]	ZRR	155	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	0.40	—	
Scottish Monarch[1]	ERS	180	Raeburn & Verel	300, **600**	P G	X	0.40	—	
Scottish Prince[1]	YXV	145	Furness, Withy & Co., Ltd.	300, **600**	P G	N	0.40	—	
Scythian[1]	ZGW	155	F. Leyland & Co., Ltd.	300, **600**	P G	N	0.40	—	
Seabank[1]	BUW	140	Kestell Bros.	300, **600**	P G	X	0.40	—	
Sea Glory[1]	ZYG	125	C. F. Leach	300, **600**	P G	X	0.40	—	
Sealda[1]	GOF	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Seamew[3]	LSE	—	General S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Seapool[1]	ZWC	160	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	

Sea Serpent[1]	ZIH	115	Leach & Co., Ltd.	300, 600	P G	X	0.40	—
Seatonia[1]	BUU	150	Hartlepool Seatonia S.S. Co.	300, 600	P G	X	0.40	—
Seattle ZJA[1]	ZJA	—	G. Heyn & Sons	300, 600	—	X	—	—
Sea Victory	GCTW	—	Dover Navigation Co., Ltd.	—	—	—	—	—
Sedbergh[1]	BNZ	150	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Sedgepool[1]	XEW	120	Sir R. Ropner & Co., Ltd.	300, 600	P G	X	0.40	—
Segura[1]	ZFG	150	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Sellasia[1]	ZIR	—	Chr. Salvesen & Co.	300, 600	P G	X	—	—
Senator EPM[1]	EPM	170	T. & J. Harrison	300, 600	P G	X	0.40	—
Sentinel II. MFB[8]	MFB	140	Eastern Telegraph Co.	300, 450, 600	P	—	0.40	—
Sequoya[8]	GQE	130	Standard Transportation Co., Ltd.	300, 600	P	X	—	
Serbino[1]	XII	170	Ellerman's Lines, Ltd.	300, 600	P G	X	0.40	—
Serbistan[1]	GCYD	140	F. C. Strick & Co.	—	—	—	—	
Servian Prince[1]	YTR	150	Furness, Withy & Co., Ltd.	300, 600	P G	N	0.40	—
Sesostris[1]	GBVD	—	R. Gordon	300, 600	P G	X	0.40	
Severn GBQT[1]	GBQT	170	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Severnmede[1]	ELT	—	D. & T. G. Adams	300, 600	P G	X	0.40	—
Shabonee[8]	GSS	140	Standard Transportation Co., Ltd.	300, 600	P	X	—	—
Shadwell[8]	YVK	—	T. & J. Brocklebank, Ltd.	—	—	—	—	—
Shahristan[1]	GCDK	140	F. C. Strick & Co.	300, 600	P G	X	0.40	—
Shakespear[1]	GJX	130	Glover Bros.	300, 600	P G	X	0.40	—
Shandon GBYJ[1]	GBYJ	150	The Foreland Shipping & Trading Co.	300, 600	P G	X	0.40	—
Sheaf Brook[1]	ZXE	130	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheaf Dart[1]	MLX	160	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheaf Don[1]	ZOL	145	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheaf Lance[1]	XMT	150	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheafmead[1]	YFP	150	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheaf Mount[1]	GBPW	145	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sheaf Spear[1]	MXH	120	W. A. Souter & Co.	300, 600	P G	X	0.40	—
Sherard Osborn[8]	MFK	140	Eastern Telegraph Co., Ltd.	300, 450, 600	P	—	0.40	—
Sheridan XHU[1]	XHU	150	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Shonga[1]	ZMI	—	Elder Dempster & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Shropshire[8]	GSF	330	Federal S.N. Co., Ltd.	300, 450, 600	P G	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—
Shuna[1]	ZPO	140	Glen & Co.	300, 600	P G	X	0.40	—
Siamese Prince[1]	YYN	200	Furness, Withy & Co., Ltd.	300, 600	P G	N	0.40	—
Siberian Prince[1]	ZTI	180	Furness, Withy & Co., Ltd.	300, 600	P G	N	0.40	—
Sibir[1]	ZMY	—	Ellerman's Wilson Line, Ltd.	300, 600	P G	X	—	—
Sicilia GMC[1]	GMC	225	P. & O. S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Sicilian[1]	MUN	170	Canadian Pacific Ocean Services, Ltd.	300, 600	P G	N	0.40	—
Sicily[1]	ESO	175	D. MacIver, Sons & Co., Ltd.	300, 600	P G	X	0.40	—
Siddons[1]	ZHY	160	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Sidlaw Range[1]	XHV	—	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Sieglinde[1]	GBPN	—	J. Westoll	300, **600**	P G	X	0.40	—	
Sikh[1]	YKZ	170	Asiatic S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Silarus[1]	GBRC	130	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Silversand[1]	EKA	140	W. P. & T. James	300, **600**	P G	X	0.40	—	
Silvertown[1]	GMD	225	J. Hamilton	300, **600**	P G	—	0.40	—	
Simoon[1]	BLP	120	Pardoe-Thomas & Co., Ltd.	300, **600**	P G	X	0.40	—	
Singapore YYA[1]	YYA	175	Westminster Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Siptah[1]	OFX	170	J. Moss & Co.	300, **600**	P G	X	0.40	—	
Sir Arthur[1]	BKM	120	Cory Colliers, Ltd.	300, **600**	P G	X	0.05	0.50	
Sir Harvey Adamson[1]	MUK	170	British India S.N. Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Siris[1]	GBRD	175	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Sitra[1]	EOJ	170	J. Moss & Co.	300, **600**	P G	X	0.40	—	
Sittang[1]	GRT	170	P. Henderson & Co.	300, **600**	—	—	—	—	
Skegness[1]	EXU	150	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Skipton Castle[1]	ETJ	145	J. Chambers & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Slav	YHY	—	Pardoe-Thomas & Co., Ltd.	300, **600**	P G	X	0.40	—	
Slavic Prince[1]	XIV	150	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Slieve Bawn[3]	YWC	135	L. & N.W. Railway Co.	300, **600**	P G	N	0.05	0.50	
Slieve Gallion[3]	YWE	135	L. & N.W. Railway Co.	300, **600**	P G	N	0.05	0-50	
Slievemore[3]	YWF	135	L. & N.W. Railway Co.	300, **600**	P G	N	0.05	0.50	
Smolensk[1]	ODS	125	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.15	1.50	
Snowdon[3]	YWG	135	L. & N.W. Railway Co.	300, **600**	P G	N	0.05	0.50	
Socrates[1]	ZHZ	160	Lamport & Holt, Ltd.	300, **600**	P G	X	0.40	—	
Sofala[1]	GOH	160	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Sofia[1]	GBNL	—	Morel, Ltd.	300, **600**	P G	X	0.40	—	
Soldier Prince[1]	ZFW	190	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	

Solfels[1]	GBKY	—	H. Hogarth & Sons	300, 600	P G ..	X	0.40	—
Solingen[1]	GBQF	—	Easton Greig Co.	300, 600	P G ..	X	0.40	—
Somali[1]	MIW	230	P. & O. S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Somersby[1]	ZYP	150	Sir R. Ropner & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Somerset EPL[1] ..	EPL	150	Federal S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Somme GBQV[1] ..	GBQV	200	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Sonnenfels[1]	GBDF	—	Thos. Law & Co.	300, 600	P G ..	X	0.40	—
Sorata[1]	MIJ	210	Pacific S.N. Co., Ltd.	300, 600	P G ..	9 to 11 a.m. 8 p.m. to 2 a.m.	0.40	—
Sorrento[1]	EXJ	115	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	X	0.40	—
Sotero[1]	ODC	145	J. Glynn & Sons, Ltd.	300, 600	P G ..	X	0.40	—
Soudan[1]	MNB	200	P. & O. S.N. Co., Ltd.	300, 600	P G ..	N	0.40	—
Southern XEV[1] ..	XEV	175	Fratres, Ltd.	300, 600	P G ..	X	0.40	—
Southern Coast[1] ..	BDP	140	Coast Lines, Ltd.	300, 600	P G ..	X	0.05	0.50
Southgate[1]	ZCZ	175	Turnbull, Scott & Co.	300, 600	P G ..	X	0.40	
Southlea[1]	BCT	140	J. Muers & Co.	300, 600	P G ..	X	0.40	
South Pacific[1] ..	YCR	160	Williams & Mordey	300, 600	P G ..	X	0.40	
Southport[1]	EKH	155	H. E. Moss & Co.	300, 600	P G ..	X	0.40	
South Stack[3]	YWH	135	L. & N.W. Railway Co.	300, 600	P G ..	N	0.05	0.50
South-Western Miller[1] ..	MTY	190	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	X	0.40	
Spartan Prince[1] ..	BFD	—	Prince Line, Ltd.	300, 600	P G ..	X	0.40	
Spectator[1]	YCV	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Spermina[1]	EYH	170	A. W. Small	300, 600	P G ..	X	0.40	—
Spezia[1]	GBLR	—	Houlder, Middleton & Co., Ltd. ..	300, 600	P G ..	X	0.40	
Spheroid[1]	GXF	175	Scrutton Sons & Co.	300, 600	P G ..	X	0.40	—
Spilsby[1]	EKD	—	Sir R. Ropner & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Stagpool[1]	ETM	130	Sir R. Ropner & Co., Ltd ..	300, 600	P G ..	X	0.40	—
Stambul[1]	GBZY	—	J. Westoll	300, 600	P G ..	X	0.40	—
Stanley Hall[1]	EOR	160	Hall Line, Ltd.	300, 600	P G ..	X	0.40	—
Stanmore[1]	EVU	140	Johnston Line, Ltd.	300, 600	P G ..	X	0.40	—
Starlight[2]	GBZC	—	H. A. Brightman & Co.	—	—	—	—	—
Start Point[1]	ZNH	200	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Statesman[1]	EPU	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Staveley[3]	EQQ	—	Great Central Railway	300, 500, 600	P R ..	X	0.10	1.00
Steigerwald[1]	GBPQ	—	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Stentor[1]	YOJ	170	A. Holt & Co.	300, 600	P G ..	X	0.40	—
Stephan[1]	GBWL	—	Eastern Telegraph Co.	300, 600	P G ..	X	0.40	—
Stephen MDJ[1]	MDJ	170	Booth S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Stockport[3]	ODZ	—	Great Central Railway	300, 600	P G ..	X	0.40	—
Stockwell[3]	GZJ	225	R. S. Dalgliesh	300, 600	P G ..	X	—	—
Stork[3]	YKK	—	General S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Strabo[1]	YOS	160	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Strathearn BEC[1] ..	BEC	170	R. R. Shankland..	300, 600	P G ..	X	0.40	—
Strathfillan[1]	ZRK	170	J. Hamilton	300, 600	P G ..	X	0.40	—
Strathlorne[1]	BNI	—	Burrell & Son	300, 600	P G ..	X	0.40	—
Stroma[1]	BEN	190	A. M. Sutherland	300, 600	P G ..	X	0.40	—
Strombus[1]	MYQ	180	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Stromness[1]	BLI	170	Letricheux & David, Ltd. ..	300, 600	P G ..	X	0.40	—
Student[1]	ZXG	170	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Sudbury EJV[1] ..	EJV	155	Capper, Alexander Co.	300, 600	P G ..	X	0.40	—
Suevic[1]	MJC	230	White Star Line	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Suffolk[3]	GRV	300	Potter, Trinder & Gwyn	300, **600**	P G ..	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—	
Sumatra XUF ..	XUF	—	British India S.N. Co., Ltd. ..	300, **600**	P G ..	X	—	—	
Sunbank[1]	GCYN	—	Sun Shipping Co., Ltd.	—	—	—	—	—	
Sunfield[1]	GCYL	—	Sun Shipping Co., Ltd.	—	—	—	—	—	
Sunik[1]	YEA	170	F. Gilbert	300, **600**	P G ..	X	0.40	—	
Suncliff[1]	GCYM	120	Sun Shipping Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Sunland[1]	ZET	120	Sun Shipping Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Sunningdale[1]	OFO	115	Tanfield S.S. Co., Ltd.	300, **600**	P G ..	X	0.05	0.50	
Sunpath[1]	GCMZ	140	Sun Shipping Co., Ltd.	—	—	—	—	—	
Sunray[1]	BAN	150	Scarisbrick S.S. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Suram[1]	YJX	130	Anglo-Saxon Petro. Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Surat[1]	GCPQ	—	A. Weir & Co.	300, **600**	P G ..	N	0.40	—	
Surrey[1]	GCBJ	180	Federal S.N. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Susquehanna ERG[1] ..	ERG	—	Union-Castle Mail S.S. Co., Ltd...	300, **600**	P G ..	N	0.40	—	
Sussex MVS[3]	MVS	240	Federal S.N. Co., Ltd.	300, **600**	P G ..	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8 p.m. to 1 a.m.	0.40	—	
Sutherland GOG[1] ..	GOG	150	A. M. Sutherland	300, **600**	P G ..	X	0.40	—	
Sutherland Grange[1] ..	GMM	180	Houlder Bros. & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Sutlej GWL[3]	GWL	115	James Nourse, Ltd.	300, **600**	P G ..	X	0.40	—	
Sutton Hall[1]	ZJG	150	Hall Line, Ltd.	300, **600**	P G ..	X	0.40	—	
Suveric[1]	GMO	180	A. Weir & Co.	300, **600**	P G ..	N	0.40	—	
Suwanee[1]	MIY	160	J. Hamilton	300, **600**	P G ..	X	0.40	—	
Swainby[1]	ZYQ	160	Sir R. Ropner & Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Swakopmund[1] ..	GBFV	—	New Zealand Shipping Co., Ltd. ..	300, **600**	P G ..	X	0.40	—	
Swazi[1]	MAV	160	Ellerman & Bucknall S.S. Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Sweethope[1]	XHZ	140	Pyman Bell & Co., Ltd.	300, **600**	P G ..	X	0.40	—	
Swinburne[1]	BDR	160	Lamport & Holt, Ltd.	300, **600**	P G ..	X	0.40	—	
Sydney Reid[1]	XJL	150	Frew, Elder & Co...	300, **600**	P G ..	X	0.40	—	
Syndic[1]	XEO	150	Melrose Abbey S. Co.	300, **600**	P G ..	X	0.40	—	
Syria[1]	GMP	250	P. & O. S.N. Co., Ltd.	300, **600**	P G ..	X	0.40	—	

Syrian Prince	GBRJ	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
S. Albans [3]	MGG	240	Eastern & Australian S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
S. Andrew GYJ [3] ..	GYJ	120	Fishguard & Rosslare Railway & Harbour Co.	300, 600	P G ..	N	0.05	0.50
S. Andrew GCBV [1] ..	GCBV	—	Rankin, Gilmour & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Bede [1]	GCBT	175	Rankin, Gilmour & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Cruz GBCW [1] ..	GBCW	—	Macvicar Marshall & Co. ..	300, 600	P G ..	X	0.40	—
S. David [3]	GYL	120	Fishguard & Rosslare Railway & Harbour Co.	300, 600	P G ..	N	0.05	0.50
S. Denis [3]	ZCK	120	Great Eastern Railway Co. ..	300, 450, 600	P R ..	N	0.10	1.00
S. Dunstan [1]	YEL	160	Rankin, Gilmour & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Dunstano [1]	MAN	160	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Eduardo [1]	MJV	160	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Fe [1]	GBSM	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
S. Fernando [1]	MUX	260	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Florentino [1] ..	MUQ	250	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Fraterno [1]	GYN	210	Eagle Transport Oil Co., Ltd. ..	300, 600	P G ..	N	0.40	—
S. George GIB [1] ..	GIB	150	Great Eastern Railway Co. ..	300, 600	P G ..	N	0.05	0.50
S. Gregorio [1]	MAC	230	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Jeronimo [1]	MJP	180	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Lorenzo [1]	MND	180	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Margaret of Scotland [1]	YPM	175	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
S. Margherita [3]	YQW	250	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	—	—
S. Melito [1]	MRZ	180	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Michael [1]	YIZ	150	Rankin, Gilmour & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Nazario [1]	MUH	200	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Patricio [1]	MQY	190	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Patrick GYM [3] ..	GYM	120	Great Western Railway Co. ..	300, 600	P G ..	N	0.05	0.50
S. Patrick YKT [1] ..	YKT	145	Rankin, Gilmour & Co., Ltd. ..	300 600	P G ..	X	0.40	—
S. Ricardo [1]	MBR	170	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Silvestre [1]	MYS	250	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Stephen [1]	EVZ	—	Rankin, Gilmour & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Theresa [1]	BLJ	150	Santa Clara S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Tirso [1]	MAO	190	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Tudno [3]	GNR	80	T. W. Tamplin	300, 600	P R ..	X	0.10	1.00
S. Valerio [1]	MHZ	180	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
S. Zeferino [1]	MPS	200	Eagle Oil Transport Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Tabarka [1]	EWN	135	F. C. Strick & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Tactician [1]	MWP	210	T. & J. Harrison	300, 600	P G ..	X	0.40	—
Tafna EOC [1]	EOC	170	C. T. Bowring & Co. ..	300, 600	P G ..	X	0.40	—
Tagus [1]	GUF	225	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Tahchee [2]	GSI	140	Standard Transportation Co., Ltd.	300, 600	P ..	X	—	—
Tainui [3]	MWF	200	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Takada [1]	MOR	230	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Talawa	VXD	—	Req. by Australian Commonwealth	—	—	—	—	—
Talthybuis [1]	GSH	155	A. Holt & Co.	300, 450, 600	P G ..	X	0.40	—
Talune GBVK [3] ..	GBVK	—	Union S.S. Co. of New Zealand, Ltd.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Tamaha [3]	GSG	140	Standard Transportation Co., Ltd.	300, **600**	P	X	—	—	
Tamaqua [1]	ZBG	180	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Tamar [1]	MPG	170	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Tamarac [1]	ZIC	150	J. Hamilton	300, **600**	P G	X	0.40	—	
Tambov [1]	ZOA	—	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Tanfield [1]	ZNU	150	British India S.N. Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Tannenberg [1]	GBXR	—	Phillips, Phillips & Co.	300, **600**	P G	X	0.40	—	
Tantah [1]	EMZ	160	Lord E. Hamilton	300, **600**	P G	X	0.40	—	
Tapton [1]	ZUG	170	Wade & Co	300, **600**	P G	X	0.40	—	
Tara [1]	GMQ	225	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Taransay [1]	OCW	150	B. J. Sutherland & Co.	300, **600**	P G	X	0.40	—	
Tarantia [13]	YRE	—	Henderson Bros.	300, **600**	—	X	—	—	
Taroba [1]	GMR	225	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Tartar Prince [1]	ZLY	150	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	—	—	
Tascalusa [3]	GSD	140	Standard Transportation Co., Ltd.	300, **600**	P	X	0.40		
Tasmania [1]	GBPS	—	F. & W. Ritson	300, **600**	P G	X	0.40		
Tasmanian Transport [1]	ZEE	135	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Tatarrax [2]	GSK	140	Tank Storage & Carriage Co., Ltd.	300, **600**	P	X			
Taxandrier [1]	OFF	150	Lloyd Royal Belge (Great Britain), Ltd.	300, **600**	P G	X	0.40		
Teenkai [1]	YPP	160	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Teesbridge [1]	YOX	140	Crosby Magee & Co., Ltd.	300, **600**	P G	X	0.40	—	
Teespool [1]	YGK	180	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40		
Teesta [1]	GMT	210	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Teiresias [1]	ZJZ	225	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Telamon [1]	ZKA	210	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Telconia [6]	MCJ	140	Telegraph Construction & Insur. Co.	300, **600**	P G	X	—	—	
Telemachus [1]	ZAI	180	A. Holt & Co.	300, **600**	—	X	0.40	—	

Tenasserim	GQY	130	P. Henderson & Co.	300, 600	P G	10 a.m. to 12 a.m. 4 to 6 p.m. 8 p.m. to 12 p.m.	0.40	—
Tennyson[1]	GDG	250	Lamport & Holt, Ltd.	300, 600	P G	N	0.40	
Tenterden[1]	YGN	150	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Tern EJP[2]	EJP	—	General S.N. Co., Ltd.	300, 600	—	X	—	—
Teucer[1]	GSJ	145	A. Holt & Co.	300, 450, 600	P G	X	0.40	—
Teviot[1]	ZHO	160	Royal Mail Steam Packet Co.	300, 600	P G	X	0.40	—
Tewkesbury[1]	XLY	120	Capper Alexander & Co.	300, 600	P G	X	0.40	—
Thamesmede[1]	BBO	115	John Adams & Sons	300, 600	P G	X	0.40	—
Themistocles MGM[1]	MGM	250	G. Thompson & Co., Ltd.	300, 600	P G	X	0.40	—
Thermidor[1]	ERM	180	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Theseus ZTB[1]	ZTB	225	A. Holt & Co.	300, 600	P G	X	0.40	—
Thespis	ZAG	—	Lamport & Holt, Ltd.	300, 600	—	X	—	—
Thessaly[1]	EMT	160	D. McIver Sons & Co., Ltd.	300, 600	P G	X	0.40	—
Thistlemore[1]	BOQ	180	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Thistletor[1]	GBSR	130	Allan, Black & Co.	300, 600	P G	X	0.40	—
Thongwa[1]	GMU	210	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Thorpe Grange[1]	YWP	230	Houlder Bros. & Co., Ltd.	300, 600	P G	X	0.40	—
Thurland Castle[1]	YCD	150	J. Chambers & Co.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Thurso[1]	GBVZ	—	Ellerman's Wilson Line, Ltd.	—	—	—	—	—
Thysa[1]	GDBK	140	J. Edgar & Co.	—	—	—	—	—
Tiara[1]	EYJ	150	Hall Bros.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Tibermede[1]	XLQ	150	The Mede Line, Ltd.	300, 600	P G	X	0.40	—
Tilly Russ[1]	GBFX	—	Cairns Noble & Co.	300, 600	P G	X	0.40	—
Tintern Abbey[1]	XHH	120	F. Jones	300, 600	P G	X	0.40	—
Tintoretto[1]	ZNM	180	Lamport & Holt, Ltd.	300, 600	P G	X	0.40	—
Titan GSO[1]	GSO	170	A. Holt & Co.	300, 450, 600	P G	X	0.40	4.00
Tiverton[1]	MXZ	140	J. I. Jacobs & Co.	300, 600	P G	X	0.40	—
Tonawanda[1]	GMV	140	J. Hamilton	300, 600	P G	X	0.40	—
Torilla[1]	GOJ	190	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Toromeo[3]	CGL	175	Req. by British Government	300, 600	P G	X	0.40	—
Toronto GBS[1]	GBS	220	Ellerman's Wilson Line, Ltd.	300, 600	P G	8 a.m. to 1 p.m. 2 to 5 p.m. 6 to 10 p.m.	0.40	—
Tosto[1]	OCQ	140	Pelton S.S. Co., Ltd.	300, 600	P G	X	0.40	—
Totmes[1]	GBFY	—	Cairns Noble & Co., Ltd.	300, 600	P G	X	0.40	—
Trafford Hall[1]	MSL	190	Hall Lines, Ltd.	300, 600	P G	X	0.40	—
Transmitter[2]	GQO	150	Eastern Telegraph Co., Ltd.	300, 450, 600	P	X	0.40	—
Trecarne[1]	ZUI	130	E. Hain & Son	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Trecarrel	GOX	180	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trefusis[1]	ZTW	—	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tregantle[1]	GXA	100	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tregarth[1]	ZDY	140	Cory Colliers, Ltd.	300, **600**	P G	X	—	—	
Tregarthen	ZDE	—	E. Hain & Son	—	—	X	—	—	
Tregenna[1]	GCDX	170	E. Hain & Son	300, **600**	P G	X	0.40	—	
Treglisson[1]	XEM	—	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tregonell[1]	XKB	—	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tregothnan[1]	BNA	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tregurno	ELR	—	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trehawke[1]	ZUF	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Treinta-y-Tres[1]	XUI	170	Houlder Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
Trekieve[1]	GCMV	—	E. Hain & Son	—	—	—	—	—	
Trelawny[1]	YIS	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trelissick[1]	GNX	175	E. Hain & Son	300, **600**	P G	X	0.40	—	
Treloske[1]	LSO	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trelyon[1]	GCKV	175	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trematon[1]	GOY	175	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tremayne[1]	LUJ	155	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tremeadow[1]	XUJ	155	E. Hain & Son	300, **600**	P G	X	0.40	—	
Tremorvah[1]	GBPJ	190	E. Hain & Son	300, **600**	P G	X	0.40	—	
Treneglos[1]	XKC	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trent[1]	GUH	250	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Trentino[1]	GRX	—	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Tresillian[1]	XUO	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Treuenfels[1]	GBKD	—	W. Runciman & Co.	300, **600**	P G	X	0.40	—	
Trevalgan[1]	BAB	140	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevanion[1]	YCI	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevarrack[1]	GOM	190	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevaylor[1]	YGG	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevean[1]	XLK	140	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevelyan[1]	GBRX	170	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevessa[1]	BGR	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevethoe[1]	ZUH	150	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevider[1]	OEF	140	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevilley[1]	YIW	115	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevince[1]	YRX	130	E. Hain & Son	300, **600**	P G	X	0.40	—	
Trevisa[1]	ZGR	105	Mr. H. M. Thomas	300, **600**	P G	X	0.15	1.50	

Trevose[1]	XKD	120	E. Hain & Son	300, 600	P G	X	0.40	—
Trewellard[1]	GIE	150	E. Hain & Son	300, 600	P G	X	0.40	—
Trewidden[1]	BMT	130	E. Hain & Son	300, 600	P G	X	0.40	—
Trident[1]	ZWX	150	Hall Bros.	300, 600	P G	X	0.40	—
Trinculo[1]	ENM	160	C. T. Bowring & Co., Ltd.	300, 600	P G	X	0.40	—
Tritonia[1]	ZNP	150	Donaldson Bros., Ltd.	300, 600	P G	X	0.40	—
Trojan Prince[1]	XLS	150	Furness, Withy & Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Tropic[1]	GDU	175	White Star Line	300, 600	P G	X	0.40	—
Trostan	EQJ	—	Stephensen Clarke & Co.	300, 600	P G	X	—	—
Troutpool[1]	ETL	110	Sir R. Ropner & Co., Ltd.	300, 600	P G	X	0.40	—
Tudor Prince[1]	YJK	130	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Tullamore[1]	XMZ	—	Johnston Line, Ltd.	300, 600	P G	X	0.40	—
Tunisian[1]	MTN	200	Canadian Pacific Ocean Services, Ltd.	300, 600	P G	N	0.40	—
Tunstall[1]	YCS	130	G. E. Ambatielos	300, 600	P G	X	0.40	—
Turbo[1]	ZNA	200	Anglo-Saxon Petro. Co., Ltd.	300, 600	P G	X	0.40	—
Turcoman[1]	GCPB	200	British & North Atlantic S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Turkestan[1]	BNQ	150	Common Bros.	300, 600	P G	X	0.40	—
Turkistan[1]	GVY	150	T. C. Strick & Co.	300, 600	P G	X	0.40	—
Tuscan Prince[1]	YJG	140	Furness, Withy & Co., Ltd.	300, 600	P G	X	0.40	—
Tuscany[1]	ZKR	180	D. MacIvers Sons & Co.	300, 600	P G	X	0.40	—
Tuscarora BYE[1]	EYE	200	J. Hamilton	300, 600	P G	X	0.40	—
Tusculum[1]	ERK	—	Fisher, Alimonda & Co., Ltd.	300, 600	P G	X	0.40	—
Tweeddale[1]	YKC	150	Albany S.N. Co., Ltd.	300, 600	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Twickenham[1]	EWS	150	Watts, Watts & Co., Ltd.	300, 600	P G	X	0.40	—
Twilight[1]	BMN	130	St. Mary S.S. Co.	300, 600	P G	X	0.40	—
Tydeus[1]	ZJM	240	A. Holt & Co.	300, 600	P G	X	0.40	—
Tymeric[1]	GBJX	160	A. Weir & Co.	300, 600	P G	X	0.40	—
Tyndareus[1]	ZKC	160	A. Holt & Co.	300, 600	P G	X	0.40	—
Tyne[1]	GAM	170	Royal Mail Steam Packet Co.	300, 600	P G	N	0.40	—
Tynemede[1]	BBQ	130	D. & T. G. Adams	300, 600	P G	X	0.40	—
Tynemouth[1]	BYX	100	Burnett & Co.	300, 600	P G	X	0.05	0.50
Tyria[1]	ZZW	175	Cunard S.S. Co., Ltd.	300, 600	P G	N	0.40	—
Uhlenhorst[1]	GBPC	—	Morel, Ltd.	300, 600	P G	X	0.40	—
Ujina[1]	GOR	180	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Ula[1]	GOL	160	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Ulidia[1]	BGP	130	G. T. Readhead & Co.	300, 600	P G	X	0.40	—
Ulster[1]	MCW	175	City of Dublin Steam Packet Co.	300, 600	P G	N	0.05	0.50
Ulysses GBU[1]	GBU	280	A. Holt & Co.	300, 600	P G	X	0.40	—
Umhloti[1]	GCDJ	—	Bullard, King & Co.	300, 600	P G	X	0.40	—
Umgeni[1]	BLV	—	Bullard, King & Co.	300, 600	P G	X	—	—
Umona[1]	BLW	—	Bullard, King & Co.	300, 600	B G	X	—	—
Umta[1]	GON	170	British India S.N. Co., Ltd.	300, 600	P G	X	0.40	—
Umtali[1]	ERI	200	Bullard, King & Co.	300, 600	P G	X	0.40	—
Umtata[1]	GCDF	—	Bullard, King & Co.	—	—	—	—	—
Umvuma[1]	ZQR	180	Bullard, King & Co.	300, 600	P G	X	0.40	—
Umzumbi[1]	EVF	—	Bullard, King & Co.	300, 600	P G	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
GREAT BRITAIN—*contd.*									
Uncas GSA [2]	GSA	140	Standard Transportation Co., Ltd.	300, **600**	P	X	—	—	
Unio	ZPX	140	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Upada [1]	GOO	200	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Upminster [1]	XHM	100	J. Hudson & Co., Ltd.	300, **600**	P G	X	0.05	0.50	
Urbino [1]	GBWP	—	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	0.40	—	
Urlana [1]	GOP	180	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Ursus [1]	YYR	130	Everett & Newbigin	—	P G	—	0.40	—	
Valacia [1]	ZKV	190	Cunard S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Valdivia	ZCM	—	The Admiralty	—	—	—	—	—	
Valdura [1]	YPT	180	Valdura S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	
Valemore [1]	XKW	150	Furness, Withy & Co., Ltd.	300, **600**	P G	X	0.40	—	
Valencia [1]	GBRT	—	Commonwealth & Dominion Line, Ltd.	300, **600**	P G	X	0.40	—	
Vale o' Moray	BSF	—	J. & J. Flett	300, **600**	P G	X	—	—	
Valiant [1]	GCPV	150	Rt. Hon. Lord Pirrie, P.C., K.P.	300, **600**	P G	X	0.40	—	
Vallejo [1]	GRK	170	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
Vancouver [2]	ERY	180	Gow, Harrison & Co.	300, **600**	P G	X	0.40	—	
Varela [1]	MSR	220	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Vardulia [1]	YXS	140	Cunard S.S. Co.	300, **600**	P G	X	0.40	—	
Varsova [1]	ZGN	240	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Varzin [1]	XIR	180	Grahams & Co.	300, **600**	P G	X	0.40	—	
Vasari [1]	GMZ	250	Lamport & Holt, Ltd.	300, **600**	P G	N	0.40	—	
Vasconia [1]	ENA	150	Cunard S.S. Co.	300, **600**	P G	X	0.40	—	
Vasna [1]	ZHE	220	British India S.N. Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Vauban [1]	MJW	250	Lamport & Holt, Ltd.	300, **600**	P G	N	0.40	—	
Vedic [1]	ZNG	160	White Star Line	300, **600**	P G	N	0.40	—	
Vellavia [1]	YYM	150	Cunard S.S. Co.	300, **600**	P G	N	0.40	—	
Venetian [1]	YIB	160	Graham Smith	300, **600**	P G	N	0.40	—	
Venice [1]	OEE	130	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Vennachar [1]	ZHK	170	Gow, Harrison & Co.	300, **600**	P G	X	0.40	—	
Vennonia [1]	EYI	150	Cunard S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	

Ventura de Larrinaga [1]	ELB	175	Larrinaga & Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Venus BFF [1]	BFF	170	Leander S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Venusia [1]	EWB	150	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Vera [1] [18]	YJU	155	L. & S.W. Railway Co.	300, 600	P G ..	N	0.15	1.50
Vera Kathleen [1] ..	ZDX	150	Hessler & Co.	300, 600	P G ..	X	0.40	—
Veraston [1]	XIA	135	Kaye, Son & Co., Ltd.	300, 600	P G ..	X	0.40	—
Verbania [1]	XIM	120	Cunard S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Verentia [1]	XMG	150	Cunard S.S. Co., Ltd.	300, 600	P G ..	N	0.40	—
Vestalia [1]	LTY	—	Gow, Harrison & Co.	—	P G ..	X	0.40	—
Vestris [1]	MJZ	250	Lamport & Holt, Ltd.	300, 600	P G ..	N	0.40	—
Victoria GUP [3]	GUP	50	S.E. & Chatham Railway Co. ..	300, 600	P G ..	N	0.15	1.50
Victoria MWD [1] ..	MWD	240	Pacific S.N. Co., Ltd.	300, 600	P G ..	N	0.40	—
Victoria de Larrinaga [1]	EMF	175	Larrinaga & Co., Ltd.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.		—
Victorian [1]	MVN	200	Canadian Pacific Ocean Services, Ltd.	300, 600	P G ..	N	0.40	—
Victorian Transport [1] ..	XEN	140	Houlder Bros. & Co., Ltd.	300, 600	P G ..	X	0.40	—
Vigo ZVT [1]	ZVT	—	Ellerman's Wilson Line, Ltd. ..	300, 600	P G ..	9 a.m. to 1 p.m. 3 to 6 p.m. 8 to 11 p.m.	0.40	—
Viking MCD [3]	MCD	140	Amazon Telegraph Co., Ltd. ..	300, 600	P ..	X	—	—
Vindelia [1]	MXD	150	Anchor Line, Ltd.	300, 600	P G ..	N	0.40	—
Vineleaf [1]	EPK	240	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
Virawa [1]	ZSR	210	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Virgil [1]	ZQI	200	Lamport & Holt, Ltd.	300, 600	P G ..	X	0.40	—
Virgilia [1]	GXB	150	Cunard S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Virginian MGN [1] ..	MGN	280	Canadian Pacific Ocean Services, Ltd.	300, 600	P G ..	N	0.40	—
Visigoth [1]	BDV	140	J. & A. Roxburgh	300, 600	P G ..	X	0.40	—
Vita [1]	MZV	230	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Vitellia [1]	BAR	140	Anchor Line, Ltd.	300, 600	P G ..	N	0.40	—
Vitruvia [1]	GYS	180	Gow, Harrison & Co.	300, 600	P G ..	X	0.40	—
Volga [1]	ZIN	—	Gow, Harrison & Co.	—	—	X	—	—
Vologda CHN [1] ..	CHN	—	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Volumnia [1]	GRM	190	Gow, Harrison & Co.	300, 600	P G ..	X	0.40	—
Volute [1]	EJY	180	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Voronej [1]	ZLM	230	Royal Mail Steam Packet Co. ..	300, 600	P G ..	N	0.40	—
Wabana [1]	YNL	170	Lowden Connell & Co.	300, 600	P G ..	X	0.40	—
Wabasha [2]	GTN	125	Standard Transportation Co., Ltd.	300, 600	P ..	X	—	—
Waddon [1]	ZWY	155	T. Hick & Co.	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Wahehe [1]	GBKJ	—	Shaw, Savill & Albion Co., Ltd...	300, 600	P G ..	X	0.40	—
Waikawa [9]	GCNY	—	Union S.S. Co. of New Zealand, Ltd.	—	—	—	—	—
▸ ▸								
Waimana [1]	GNE	230	Shaw, Savill & Albion Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Waimate [1]	MOS	140	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Waipara [1]	GNK	125	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Wairuna[9]	ENL	—	Union S.S. Co. of New Zealand, Ltd.	300, **600**	P G	X	0.40	—	
Waitemata GBNM[9]	GBNM	—	Union S.S. Co. of New Zealand, Ltd.	300, **600**	P G	X	0.40	—	
Waiwera[1]	MRV	240	Shaw, Savill & Albion Co., Ltd.	300, **600**	P G	X	0.40	—	
Waldenburg[1]	GBMQ	—	F. C. Strick & Co., Ltd.	300, **600**	P G	X	0.40	—	
Wallace[1]	MQX	—	T. Lewis & Co.	300, **600**	P G	X	0.40	—	
Walmer Castle[1]	MQH	200	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Waltham[1]	YBA	—	Petersen & Co., Ltd.	300, **600**	P G	X	0.40	—	
Walton Hall[1]	MTH	150	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
Wandby[1]	MWX	120	Sir R. Ropner & Co., Ltd.	300, **600**	P G	X	0.40	—	
Wanderer ZBO[1]	ZBO	180	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Wangaratta[1]	GBQP	210	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warawala[1]	YBM	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warcuta[1]	ZJH	150	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warepa[1]	YBU	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warfield[1]	EKT	200	British India S.N. Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Warialda[1]	YZJ	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warina[1]	XLP	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warkworth[1]	EIO	150	R. S. Dalgliesh	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Warla[1]	XXD	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Waroonga	GCX	155	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warri[1]	YMI	170	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Warora[1]	BUL	—	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Warrior ZPQ	ZPQ	175	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Wartburg[1]	GBTR	—	Lyle Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Warturm[1]	BLY	—	Grahams & Co.	300, **600**	P G	X	—	—	
Warwickshire[1]	MYO	250	Bibby Bros. & Co.	300, **600**	P G	X	0.40	—	
Waterford[9]	YZY	110	Great Western Railway Co.	300, **600**	—	—	—	—	
Watsness[1]	YLE	140	Letricheux & David	300, **600**	P G	X	0.40	—	
Wayfarer[1]	GCI	230	T. & J. Harrison	300, **600**	P G	X	0.40	—	
Waziristan[1]	BNO	155	Common Bros.	300, **600**	P G	X	0.40	—	

Wearbridge[1]	FKI	—	Crosby Magee & Co.	300, 600	P G ..	X	0.40	—
Weardale[1]	BTU	—	Weardale S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Wearpool[1]	ERU	140	Sir R. Ropner & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Wearwood[1]	BUD	140	Joseph Constantine	300, 600	P G ..	X	0.40	—
Weehawken[1]	YZL	160	J. I. Jacobs & Co.	300, 600	P G ..	X	0.40	—
Weissenfelde[1]	GBQK	—	H. Hogarth & Sons	300, 600	P G ..	X	0.40	—
Weissenfels[1]	GBDK	—	A. Weir & Co.	300, 600	P G ..	X	0.40	—
Wellpark[1]	XEA	130	J. & J. Denholm	300, 600	P G ..	X	0.40	—
Wells City[1]	BQV	150	C. Hill & Sons	300, 600	P G ..	X	0.40	—
Welshman[1]	GCPD	240	British & North Atlantic S.N. Co., Ltd.	300, 600	P G ..	X	0.40	—
Weltondale[1]	GXK	115	T. C. Steven & Co.	300, 600	P G ..	X	0.40	—
Wentworth[1]	GBCN	170	The Dalgliesh S.S. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
Westborough[1] ..	BDJ	140	Humphries (Cardiff), Ltd. ..	300, 600	P G ..	X	0.40	—
Westcliff[1]	EUD	150	W. Reay-Smith & J. W. Morrison	300, 600	P G ..	X	0.40	—
Western[1]	OFB	—	J. Mathias & Sons.. ..	300, 600	P G ..	X	0.40	—
Western Valleys[1] ..	GCYK	135	Cleeves Valleys Anthracite Collieries, Ltd.	—	—	—	—	—
Westhope[1]	XKX	100	J. Westoll	300, 600	P G ..	X	0.40	—
Westmeath[1]	MJQ	190	Union S.S. Co. of New Zealand, Ltd.	300, 600	P G ..	X	0.40	—
Westmoreland ZBM[1]	ZBM	180	Federal S.N. Co., Ltd.	300, 600	P G ..	8 a.m. to 12 a.m. 2 to 3 p.m. 6 to 12 p.m.	0.40	—
Whakatane[1]	MRI	180	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Whateley Hall[1] ..	EZW	140	Hansen Bros., Ltd.	300, 600	P G ..	X	0.40	—
Whimbrel[1]	YGQ	120	Cork S.S. Co., Ltd.	300, 600	P G ..	X	0.05	0.50
Whinfield[1]	BQF	150	E. J. Sutton & Co.	300, 600	P G ..	X	0.40	—
Whitby Abbey[1] ..	GCBK	120	J. H. N. Ringrose	300, 600	P G ..	X	0.05	0.50
Whitwood[1]	XFR	120	W. France Fenwick & Co. ..	300, 600	P G ..	X	0.40	—
Wigmore[1]	EQH	140	Johnston Line, Ltd.	300, 600	P G ..	X	0.40	—
Wilhelm Hemsoth[1] ..	GBXM	—	Pentwyn S.S. Co., Ltd.	300, 600	P G ..	X	0.40	—
Willaston[1]	YCP	160	J. Edgar & Co.	300, 600	P G ..	X	0.40	—
Willesden[1]	EVG	140	Watts, Watts & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
William Balls[1].. ..	BTF	130	W. D. C. Balls & Sons	300, 600	P G ..	X	0.40	—
William Middleton[1] ..	XET	150	J. Westoll	300, 600	P G ..	X	0.40	—
Wilston[1]	GTX	155	W. S. Miller & Co...	300, 600	P G ..	X	0.40	—
Wiltshire[3]	GHD	330	Federal S.N. Co., Ltd.	300, 600	P G ..	9 a.m. to 12.30 p.m. 1 to 2 p.m. 4 to 6 p.m. 8p.m. to 1 a.m.	0.40	—
Wimbledon[1]	LUK	160	J. Crass & Co.	300, 600	P G ..	X	0.40	—
Wimborne[1]	EWE	160	E. Thomas Radcliffe & Co., Ltd...	300, 600	P G ..	X	0.40	—
Winamac[2]	GSM	140	Standard Transportation Co., Ltd.	300, 600	P ..	X	—	—
Windhuk[1]	GBFT	—	New Zealand Shipping Co., Ltd...	300, 600	P G ..	X	0.40	—
Winfried[1]	GBWR	—	H. Hogarth & Sons	300, 600	P G ..	X	0.40	—
Wingate[1]	OEJ	120	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
Winifredian[1]	MFL	250	F. Leyland & Co., Ltd.	300, 600	P G ..	N	0.40	—
Winkfield[1]	OCV	175	British India S.N. Co., Ltd. ..	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
Winnebago ZAP[1]	ZAP	150	Anglo-American Oil Co., Ltd.	300, **600**	P G	X	0.40	—	
Winterton[3]	ODI	—	Denaby & Cadeby Main Collieries, Ltd.	300, **600**	P G	X	0.40	—	
W. I. Radcliffe[1]	LSA	145	E. Thomas Radcliffe & Co., Ltd.	300, **600**	P G	X	0.40	—	
Wisley[1]	YWX	130	Canada S.S. Lines	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Woldingham	BOV	130	Glynn Shipping Co.	300, **600**	P G	X	0.40	—	
Wolfram[1]	GBKQ	—	P. Henderson & Co.	300, **600**	P G	X	0.40	—	
Wolfsburg[1]	GBDM	—	Elder Dempster & Co., Ltd.	300, **600**	P G	X	0.40	—	
Wolverton[1]	ODQ	—	H. A. Brightman & Co.	300, **600**	P G	X	0.40	—	
Woodarra[1]	GCFK	—	British India S.N. Co., Ltd.	—	—	—	—	—	
Woodburn[1]	XMA	140	Jenkins Richards & Evans	300, **600**	P G	X	0.40	—	
Woodcock EJB[3]	EJB	—	General S.N. Co., Ltd.	300, **600**	—	X	—	—	
Woodfield[1]	YNA	140	Woods, Tylor & Brown	300, **600**	P G	X	0.40	—	
Woodville[1]	XKQ	140	Richard Irvin	300, **600**	P G	X	0.40	—	
Worsley Hall[1]	MDW	160	Hall Line, Ltd.	300, **600**	P G	X	0.40	—	
Wotan	GBLW	—	T. Law & Co.	300, **600**	P G	X	0.40	—	
Wulsty Castle[1]	GOZ	140	J. Chambers & Co.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Wye Crag[1]	EMV	150	Wye Shipping Co., Ltd.	300, **600**	P G	X	0.40	—	
Wyncote[1]	ZBI	190	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Wye Tempest[1]	YOP	150	Wye Shipping Co.	300, **600**	P G	X	0.40	—	
Wyneric[1]	MTB	200	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Wyvisbrook[1]	ZCS	200	Miller & Richards, Ltd.	300, **600**	P G	X	0.40	—	
War African[1]	OFA	150	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
War Algoma[1]	XYS	—	Tyzack & Branfoot	—	—	—	—	—	
War Atlin[1]	XXF	—	J. Cook & Sons	300, **600**	P G	X	0.40	—	
War Bahadur[1]	LUN	150	C. T. Bowring & Co., Ltd.	300, **600**	P G	X	0.40	—	
War Begum[1]	XMK	180	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
War Beryl[1]	BMK	170	Canadian Pacific Railway Co.	300, **600**	P G	X	0.40	—	
War Breaker[1]	YFB	150	J. Black & Co.	300, **600**	P G	X	0.40	—	

War Breeze[1]	ERR	150	Times Shipping Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Casco[1]	XYA	—	J. Hardy & Co.	300, 600	P G ..	X	0.40	—
War Chariot[1]	XYI	—	Raeburn & Verel, Ltd.	300, 600	P G ..	X	—	—
War Chilkat[1]	XYH	—	J. Hardie & Co.	300, 600	P G ..	X	0.40	—
War Diwan[1]	XMM	170	C. T. Bowring & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Dogra[1]	GCDN	150	Gow, Harrison & Co.	300, 600	P G ..	X	0.40	—
War Down[1]	ENG	160	G. E. Williams	300, 600	P G ..	X	0.40	—
War Earl[1]	XXB	150	Union-Castle Mail S.S. Co., Ltd...	300, 600	P G ..	X	0.40	—
War Expert	BQM	—	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Fundy[1]	ZTK	—	Brown, Jenkinson & Co.	300, 600	P G ..	X	0.40	—
War Fury[1]	XYX	—	R. C. Downing	300, 600	P G ..	X	—	—
War Gaekwar[1] ..	XVN	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Ghurka[1]	OFH	160	Hunting & Son	300, 600	P G ..	X	0.40	—
War Hagara[1]	GBVW	150	A. Weir & Co.	300, 600	P G ..	X	0.40	—
War Halifax[1]	ZTG	—	Hansen Bros. & Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Halton[1]	XYT	—	Tysack & Branfoot	—	—	—	—	—
War Hermit[1]	BPW	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Hindoo[1]	GCZK	190	Gow, Harrison & Co.	—	—	—	—	—
War Jandoli[1]	ZRP	150	Lane & Macandrew, Ltd. ..	300, 600	P G ..	X	0.40	—
War Jemadar[1]	OFI	150	Hunting & Son	300, 600	P G ..	X	0.40	—
War Khan[1]	LUE	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Knight[1]	BBY	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
War Kookri[1]	GBRY	180	Lane & Macandrew, Ltd. ..	300, 600	P G ..	X	0.40	—
War Krishna[1]	GCTD	—	Lane & Macandrew, Ltd. ..	—	—	—	—	—
War Master	BQL	—	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Matron[1]	BQO	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Mehtar[1]	BTC	—	Hunting & Son	300, 600	P G ..	X	0.40	—
War Mingan[1]	BRC	—	Anning Bros.	300, 600	P G ..	X	0.40	—
War Mogul[1]	GBXP	150	Anglo-American Oil Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Moncton[1]	ZTN	—	Hansen Bros. & Co., Ltd. ..	—	—	—	—	—
War Nawab[1]	XML	—	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
War Nizam[1]	OFN	150	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
War Noble	XYR	—	Raeburn & Verel	300, 600	P G ..	X	0.40	—
War Ottawa[1]	XXM	—	Glover Bros.	300, 600	P G ..	X	—	—
War Panthan[1]	GBCM	145	A. Weir & Co.	300, 600	—	X	—	—
War Patriot[1]	BPY	150	Anglo-Saxon Petro. Co., Ltd. ..	300, 600	P G ..	X	0.40	—
War Peridot[1]	YJM	200	Canadian Pacific Railway Co. ..	300, 600	P G ..	X	—	—
War Pibroch[1] ..	XLR	—	R. Mackie & Co.	300, 600	P G ..	X	0.40	—
War Pigeon[1]	ZIE	—	Bell Symondson & Co.	300, 600	P G ..	X	0.40	—
War Prince[1]	BCL	—	Furness, Withy & Co., Ltd. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—
War Pundit[1]	BOR	150	Stephens, Sutton & Stephens ..	300, 600	P G ..	X	—	—
War Pyramid[1] ..	EUB	160	R. W. J. Sutherland & Co. ..	300, 600	P G ..	X	—	—
War Quebec[1]	MXU	—	Anning Bros.	300, 600	P G ..	X	—	—
War Radnor[1]	YLH	—	Anning Bros.	300, 600	P G ..	X	—	—
War Rajah[1]	OFK	145	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
War Rajput[1]	OFM	150	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
War Ranee[1]	OFL	150	British Tanker Co., Ltd.	300, 600	P G ..	X	0.40	—
War Seneca[1]	YXA	—	Glover Bros.	300, 600	P G ..	X	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREAT BRITAIN—*contd.*							Francs.	Francs.	
War Sepoy[1]	OCP	145	Anglo-Mexican Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
War Shikari[1]	OFJ	140	Hunting & Son	300, **600**	P G	X	0.40	—	
War Sikh[1]	YQR	—	British Tanker Co., Ltd.	300, **600**	P G	X	0.40	—	
War Singer[1]	OES	—	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
War Soldier[1]	BBW	—	Furness, Withy & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
War Sorel[1]	BST	—	Anning Bros.	300, **600**	P G	X	—	—	
War Spray[1]	XJX	150	R. W. J. Sutherland & Co.	300, **600**	P G	X	0.40	—	
War Subadar[1]	OFG	120	Anglo-Saxon Petro. Co., Ltd.	300, **600**	P G	X	0.40	—	
War Swan[1]	YVC	150	E. Bigland & Co., Ltd.	300, **600**	P G	X	0.40	—	
War Tanoo[1]	XYQ	—	J. Hardie & Co.	300, **600**	P G	X	—	—	
War Taurus[1]	XXT	—	Cory Colliers	300, **600**	P G	X	0.40	—	
War Thistle[1]	BNN	—	Glen & Co.	300, **600**	P G	X	0.40	—	
War Toronto[1]	ZSY	—	Hansen Bros. & Co., Ltd.	300, **600**	P G	X	0.40	—	
War Vixen[1]	XYU	—	E. C. Downing	—	—	—	—	—	
War Witch[1]	XXR	—	Furness, Withy & Co. (Halifax, N.S.)	300, **600**	P G	X	—	—	
War Wizard[1]	YBJ	—	E. C. Downing	300, **600**	P G	X	0.40	—	
War Yukon[1]	EIA	—	Brown, Jenkinson & Co.	300, **600**	P G	X	0.40	—	
War Zephyr[1]	YFY	150	Vernco S.S. Co.	300, **600**	P G	X	0.40	—	
Yang Tsze[1]	ZKO	185	A. Holt & Co.	300, **600**	P G	X	0.40	—	
Yarborough[1]	YLM	135	W. R. Smith & Sons	300, **600**	P G	X	0.40	—	
Yaroslavl[1]	ZOK	200	Royal Mail Steam Packet Co.	300, **600**	P G	N	0.40	—	
Yonne[1]	ZWV	180	L. Walford (London), Ltd.	300, **600**	P G	X	0.40	—	
York Castle[1]	ERC	—	Union-Castle Mail S.S. Co., Ltd.	300, **600**	P G	N	0.40	—	
Yoseric[1]	ZFN	—	A. Weir & Co.	300, **600**	P G	X	0.40	—	
Ypiranga[1]	GBJP	—	White Star Line	300, **600**	P G	X	—	—	
Zaida[1]	XGE	175	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—	
Zamora[1]	ZVX	130	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—	
Zaria[1]	ZMP	160	Elder Dempster & Co., Ltd.	300, **600**	P G	6 to 8 a.m. 9 a.m. to 12 n. 2 to 6 p.m. 8 to 10 p.m.	0.40	—	
Zealand MTX[1]	MTX	120	J. Currie & Co.	300, **600**	P G	X	0.40	—	
Zealandic[1]	MUZ	240	White Star Line	300, **600**	P G	X	0.40	—	
Zelo[1]	BCE	120	Pelton S.S. Co., Ltd.	300, **600**	P G	X	0.40	—	

Zermatt[1]	EUZ	140	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—
Zero[1]	EUH	160	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—
Zimorodok	YEX	160	Ellerman's Wilson Line, Ltd.	300, **600**	P G	X	—	—
Zingara[1]	ZXA	135	Turner, Brightman & Co.	300, **600**	P G	X	0.40	—
Zira[1]	XGF	160	British India S.N. Co., Ltd.	300, **600**	P G	X	0.40	—
Zuleika[1]	EUJ	150	Turner, Brightman & Co...	300, **600**	P G	X	0.40	—
Zurichmoor[1]	YIR	140	W. Runciman & Co., Ltd.	300, **600**	P G	X	0.40	—
GREECE								
Adamantios Lemos[1]	SWX	100-150	Lemos M. Piraeus	300, **600**	P G	X	0.40	4.00
Adriaticos[1]	SVA	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Aeon[1]	SWA	100-150	Nav. à Vapeur Panhellénique	300, **600**	P G	N	0.40	4.00
Aetos	SYO	—	Navy	—	O	—	—	—
Aigli	SYV	—	Navy	—	O	—	—	—
Alcyon	SYU	—	Navy	—	O	—	—	—
Amfitrite	SYM	—	Navy	—	O	—	—	—
Amphitrite	—	—	Government	—	—	—	—	—
Andreas[1]	SVS	100-150	Embiricos Bros.	300, **600**	P G	X	0.40	4.00
Antigoni[1]	SVJ	—	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Antonios[1]	SVX	—	—	—	—	—	—	—
Anchangelos[1]	SVR	—	—	—	—	—	—	—
Arethousa	SYW	—	Navy	—	O	—	—	—
Argolis[1]	SWG	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Aristidis Bistis[1]	SWI	—	A. Bistis & Co., Ltd. (London)	—	—	—	—	—
Aspis	SYI	—	Navy	—	O	—	—	—
Athina[1]	SVM	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Averoff	SYA	—	Navy	—	O	—	—	—
Chios[1]	SVB	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Daphni	SYX	—	Navy	—	O	—	—	—
Dionyssios Stathatos[1]	SWC	—	—	—	—	—	—	—
Dirphys[1]	SVZ	100-150	Nav. à Vapeur Panhellénique	300, **600**	P G	N	0.40	4.00
Doris SYY	SYY	—	Navy	—	O	—	—	—
Doxa	SYD	—	Navy	—	O	—	—	—
Efstathios[1]	SWD	—	—	—	—	—	—	—
Elpidophoros[1]	SWH	100-150	E. Ladopoulo Sons	300, **600**	P G	N	0.40	4.00
Elpis[1]	SVL	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	X	0.40	4.00
Eperoki[1]	SWU	—	G. Yannoulato Bros.	300, **600**	P G	X	0.40	4.00
Erissos[1]	SVE	100-150	Gregory J. Theophilatos	300, **600**	P G	X	0.40	4.00
Ermoupolis[1]	SVO	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Evangelos[1]	—	130	Ambatelos & Co.	—	—	—	—	—
Ghoissa[1]	SVG	150	Embiricos Bros.	300, **600**	P G	N	0.40	4.00
Granicos[1]	SWS	—	M. Embiricos	—	—	—	—	—
Helli	SZA	—	Navy	—	O	—	—	—
Hilarius	SWL	—	—	—	—	—	—	—
Hydra SYH	SYH	—	Navy	—	O	—	—	—
Hydra SVH[1]	SVH	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00
Iera	SYE	—	Navy	—	O	—	—	—
Ioannis Vatis[1]	SWR	100-150	J. L. Vatis & Co.	300, **600**	P G	X	0.40	4.00
Irene[1]	SVY	—	—	—	—	—	—	—
Iro[1]	SWT	100-150	P. Margaronis & Sons	300, **600**	P G	X	0.40	4.00
Istros[1]	SVW	—	—	—	—	—	—	—
Joulia[1]	SWE	—	—	—	—	—	—	—

[1] Operated by the owner of the vessel; controlled by the Soc. Anonyme Internationale de Tel. sans fils

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
GREECE—*contd.*							Francs.	Francs.	
Kalypso Vergotti[1]	SVK	—	—	—	—	—	—	—	
Kanaris	SYJ	—	Navy	—	O	—	—	—	
Kate[1]	SWZ	—	—	—	—	—	—	—	
Keravnos	SYK	—	Navy	—	O	—	—	—	
Kilkis SZC	SZC	—	Navy	—	O	—	—	—	
Leon	SYL	—	Navy	—	O	—	—	—	
Limnos	SZB	—	Navy	—	O	—	—	—	
Lonchi	SYC	—	Navy	—	O	—	—	—	
Maroudio Inglessi[1]	SWM	100-150	D. Inglessi & Sons	300, **600**	P G	X	0.40	4.00	
Meandros[1]	—	—	—	—	—	—	—	—	
Megali Hellas[1]	SVV	200-250	Comp. Nat. Hellenique de Nav.	300, **600**	P G	N	0.40	4.00	
Melpo[1]	SVQ	180	Shipping Controller	—	—	—	—	—	
Michael L. Embiricos[1]	SWY	150-200	S. G. Embiricos	300, **600**	P G	X	0.40	4.00	
Mykali[1]	SVF	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00	
Nafkratousa	SYR	—	Navy	—	O	—	—	—	
Nea Gennea	SYG	—	Navy	—	O	—	—	—	
Nicolaos Athanassulis[1]	SVI	—	A. N. Athanassulis	—	—	—	—	—	
Niki	SYN	—	Navy	—	O	—	—	—	
Nikopolis	SZD	—	Navy	—	O	—	—	—	
Ourana[1]	SVN	100-150	P. Pantaleon Fils	300, **600**	P G	N	0.40	4.00	
Panaghis[1]	SWP	—	—	—	—	—	—	—	
Panaghis Vergottis[1]	THZ	—	—	—	—	—	—	—	
Panthir	SYP	—	Navy	—	O	—	—	—	
Pantias Rallis[1]	SWB	100-150	Nav. à Vapeur Panhellénique	300, **600**	P G	N	0.40	4.00	
Patris[1]	SVP	140	Embiricos Bros.	300, 450, **600**	P G	N	0.40	4.00	
Peloponissos[1]	SVD	100-150	Hellenic Co. of Mar. Enterprises	300, **600**	P G	N	0.40	4.00	
Promithefs	SZE	—	Navy	—	O	—	—	—	
Psara	SYQ	—	Navy	—	O	—	—	—	
Rokos Vergottis[1]	SVU	—	—	—	—	—	—	—	
Sfendoni	SYF	—	Navy	—	O	—	—	—	
Spetsai	SYS	—	Navy	—	O	—	—	—	
Syria[1]	SVC	200	Comp. Nat. Hellénique de Nav.	300, **600**	P G	N	0.40	4.00	
Themistocles SVT[1]	SVT	—	Embiricos Bros.	300, 450, **600**	P G	N	0.40	4.00	
Thétis SYZ	SYZ	—	Navy	—	O	—	—	—	
Thyella	SYT	—	Navy	—	O	—	—	—	
Velos	SYB	—	Navy	—	O	—	—	—	
Zakynthos[1]	SWV	—	G. Yannoulato Bros.	300, **600**	P G	X	0.40	4.00	
Zinos Sifneo[1]	SWW	-	Furness, Withy & Co. (London)	—		—	—	—	

HOLLAND

Ship	Call	Power	Owner	Wavelengths					
Achilles [1]	TWW	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Adonis [1]	TWX	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Agamemnon [1]	TWY	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Algenib [1]	PXK	200	V. Nievelt, Goudriaan Stoomv.My.	300, 600	P G	..	X	0.40	4.00
Alkaid [1]	PXN	125	V. Nievelt, Goudriaan Stoomv.My.	300, 600	P G	..	X	0.40	4.00
Alkmaar [1]	PYH	200	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Almelo [1]	PYG	200-250	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Alphard [1]	PXL	200	V. Nievelt Goudriaan Stoomv.My.	300, 600	P G	..	X	0.40	4.00
Ambon [1]	PYR	200	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Ameland	PIX	50-80	Stoomvaart My. Triton	300, 600	P G	..	X	0.40	4.00
American PDT [1]	PDT	100-150	American Petroleum Co.	300, 600	P G	..	X	0.40	4.00
Amor [1]	TWZ	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Amsteldyk [1]	PEE	100-150	Holland Amerika Line	300, 600	P G	..	X	0.40	4.00
Amstelland [1]	PZU	200	Kon. Hollandsche Lloyd	300, 600	P G	..	X	0.40	4.00
Amstelstroom [1]	TVO	150	Hollandsche Stoomb. My.	300, 600	P G	..	X	0.40	4.00
Andyk [1]	TVA	200	Holland-Amerika Line	300, 600	P G	..	X	0.40	4.00
Antenor [1]	PZL	150-200	Stoomv. My. Ocaan.	300, 600	P G	..	X	0.40	4.00
Anton V. Driel [1]	PEP	100-150	V. Driel's N/V. W. Stoomb. en Transp.	300, 600	P G	..	X	0.40	4.00
Arakan [1]	PHD	100-150	Rotterdamsche Lloyd	300, 600	P G	..	X	0.40	4.00
Ares [1]	TWV	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Artemis PDZ [1]	PDZ	150-200	Petroleum My. La Corona	300, 600	P G	..	X	0.40	4.00
Arundo [1]	PXA	100-150	Mij. Zeevaart (Hudig & Veder)	300, 600	P G	..	X	0.40	4.00
Baarn [1]	TXO	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Bacchus [1]	TXA	—	Kon. Nederl. Stoomboot My.	300, 600	P G	..	X	0.40	4.00
Bali [1]	PIK	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Banda [1]	PZM	150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Bandoeng [1]	PFW	150	Rotterdamsche Lloyd	300, 600	P G	..	X	0.40	4.00
Banka [1]	PHI	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Barendrecht [1]	PXD	150	Ph. van Ommeren	300, 600	P G	..	X	0.40	4.00
Barentsz [1]	PMI	250	Kon. Paketvaart My.	300, 600	P G	..	N	0.40	4.00
Batavier II [1]	PDO	—	Wm. H. Muller & Co.	300, 600	P R	..	N	0.05	0.50
Batavier III [1]	PDH	200	Wm. H. Muller & Co.	300, 450, 600	P R	..	N	0.05	0.50
Batavier IV [1]	PDI	200	Wm. H. Muller & Co.	300, 450, 600	P R	..	N	0.05	0.50
Batavier VI [1]	PDG	100-150	Wm. H. Muller & Co.	300, 600	P R	..	N	0.05	0.50
Batavier V [1]	PDJ	—	Wm. H. Muller & Co.	300, 600	P R	..	N	0.05	0.50
Batjan [1]	PGV	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Batoe [1]	PYQ	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Bawean [1]	PHJ	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Bellatrix [1]	PXQ	125	V. Nievelt, Goudriaan Stoomv. My.	300, 600	P G	..	X	0.40	4.00
Bengkalis [1]	PHZ	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Berkelstroom [1]	TVP	150	Hollandsche Stoomb. My.	300, 600	P G	..	X	0.40	4.00
Beukelsdyk [1]	TVB	200	Holland-Amerika Line	300, 600	P G	..	X	0.40	4.00
Billiton [1]	PGT	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Bintang [1]	PHV	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Birma [1]	PFR	—	Rotterdamsche Lloyd	300, 600	P G	..	X	0.40	4.00
Boeroe [1]	PHK	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Boeton [1]	PGU	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00
Bondowoso [1]	PFO	200	Rotterdamsche Lloyd	300, 600	P G	..	X	0.40	4.00
Bontekoe [1]	—	—	Kon. Paketvaart Maatschappy	300, 600	P G	..	X	0.40	4.00
Borneo [1]	PHY	100-150	"Nederland" Stoomvaart My.	300, 600	P G	..	X	0.40	4.00

[1] Operated and controlled by Nederlandsche Telegraaf Maatschappij "Radio Holland," Amsterdam

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Brabantia[1]	PZZ	Day 500 Night 1,000	Kon. Hollandsche Lloyd	300, **600**, 1,000	P G	X	0.40	4.00	
Breda[1]	TWU	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Brielle[1]	TWT	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Brinio	PAV	60	Navy	300, **600**	O	—	—	—	
Brunswijk[1]	PIV	50-80	Erhardt & Dekkers	300, **600**	P G	X	0.40	4.00	
Buitenzorg[1]	PHU	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Bulhond	PBZ	150	Navy	300, **600**	O	—	—	—	
Bussen[1]	PZA	125	Vinke & Co.	300, **600**	P G	X	0.40	4.00	
Calcutta[1]	PYT	150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
California[1]	PXG	200	N. V. Oliefabrieken Insulinde	300, **600**	P G	X	0.40	4.00	
Calypso[1]	TXB	—	Kon. Nederland Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Celaeno[1]	PIY	100-150	Hudig & Veder	300, **600**	P G	X	0.40	4.00	
Celebes[1]	PGO	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Ceram[1]	PYS	150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Ceres[1]	PYW	200	Kon. Nederl. Stoomb. My.	300, **600**	P G	X	0.40	4.00	
Ceylon PHE[1]	PHE	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Cilo[1]	TXC	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Commewijne[1]	PEL	150-200	Kon. West. Ind. Maildienst	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Crynssen[1]	PYU	200-250	Kon. West. Ind. Maildienst	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.0	
Dardanus[1]	PEV	150-200	Stoomvaart Mij. Oceaan	300, **600**	P G	X	0.40	4.00	
Delftland[1]	PDY	200	Kon. Hollandsche Lloyd	300, **600**	P G	X	0.40	4.00	
Delft[1]	PXW	200	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Deli[1]	PGG	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
De Ruijter	PAC	200	Navy	300, **600**	O	—	—	—	
Deucalion	TXQ	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
De Zeven Provincien	PAA	400	Navy	300, **600**	O	—	—	—	
Djambi[1]	PIM	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Djebres[1]	PGD	200	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	

Djember[1]	PHF	100-150	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Djocja[1]	PFU	—	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Drechterland[1]	PDR	150	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Drechtstroom[1]	TVQ	150	Hollandsche Stoomb. My. ..	300, 600	P G ..	X	0.40	4.00
Drente[1]	PZY	100	Bureau Wysmuller	300, 600	P G ..	X	0.40	4.00
Dubhe[1]	PXS	200	V. Nievelt Goudriaan Stoomv. My.	300, 600	P G ..	X	0.40	4.00
Eemland[1]	PYJ	150	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Eibergen[1]	PIW	100	Furn. Scheep. & Agent. My. ..	300, 600	P G ..	X	0.40	4.00
Ellewoutsdyk[1] ..	PYP	200	Sollevold and v. d. Meer ..	300, 600	P G ..	X	0.40	4.00
Evertsen	PAN	100	Navy	300, 600	O ..	—	—	—
Fret	PBY	150	Navy	300, 600	O ..	—	—	—
Friesland[1]	PIH	—	Bureau Wysmuller	300, 600	P G ..	X	0.40	4.00
Frisia[1]	PEF	200-250	Kon. Hollandsche Lloyd	300, 600	P G ..	N	0.40	4.00
Friso	PAW	60	Navy	300, 600	O ..	—	—	—
Gaasterland[1]	PYK	150	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Garoet[1]	PIN	100-150	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Gelderland	PAK	100	Navy	300, 600	O ..	—	—	—
Gelria[1]	PEG	200-250	Kon. Hollandsche Lloyd	300, 450, 600	P G ..	N	0.40	4.00
Goentoer[1]	PFA	200	Rotterdamsche Lloyd	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Gonymedes[1]	PYI	200	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Gorredijk[1]	PIL	200	Holland-Amerika Line	300, 600	P G ..	X	0.40	4.00
Gorontalo[1]	PGC	100-150	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Gooiland[1]	PDU	100	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Gouwestroom[1]	TVR	150	Hollandsche Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
De Greve[1]	PMO	100	Kon. Paketvaart My.	300, 600	P G ..	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 8 to 10 p.m.	0.40	4.00
Gruno	PAU	60	Navy	300, 600	O ..	—	—	—
Grotius[1]	PFI	200	"Nederland" Stoomvaart My. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Haarlem[1]	TWR	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Hagno[1]	PXC	150	Hudig & Veder	300, 600	P G ..	X	0.40	4.00
Hector[1]	TWS	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Helder[1]	TXP	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Hercules[1]	TXD	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Hermelijn	PBT	150	Navy	300, 600	O ..	—	—	—
Hermes PDX[1]	PDX	150-200	Petroleum My. La Corona ..	300, 600	P G ..	X	0.40	4.00
Hermes TWQ	TWQ	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Hertog Hendrik ..	PAD	200	Navy	300, 600	O ..	—	—	—
Hilversum[1]	PZD	200	Vinke & Co.	300, 600	P G ..	X	0.40	4.00
Holland	PAH	200	Navy	300, 600	O ..	—	—	—
Hollandia[1]	PEH	200-250	Kon. Hollandsche Lloyd	300, 600	P G ..	N	0.40	4.00
Hontestroom[1] ..	TVS	150	Hollandsche Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Houtman[1]	PMC	300	Kon. Paketvaart My.	300, 600	P G ..	N	0.40	4.00
Humber[1]	PIB	75-100	Internationale Sleepdienst. ..	300, 450, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Hydra	PAQ	60	Navy	300, **600**	O	—	—	—	
India [1]	PXH	200	N.V. Oliefabrieken Insulinde	300, **600**	P G	X	0.40	4.00	
Insulinde [1]	PFS	150-200	Rotterdamsche Lloyd	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Iris PHQ [1]	PHQ	150-200	Petroleum My. La Corona	300, **600**	P G	X	0.40	4.00	
Jaarstroom [1]	TVT	150	Hollandsche Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Jacatra [1]	PFX	150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
S. Jacob [1]	PMG	150	Konink. Paketvaart My.	300, **600**	P G	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 8 to 10 p.m.	0.40	4.00	
Jacob van Heemskerck	PAL	100	Navy	300, **600**	O	—	—	—	
Jakhals	PBU	150	Navy	300, **600**	O	—	—	—	
J. P. Coen [1]	PFL	150-200	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Jan V. Nassau [1]	PXX	200	Kon. West Ind. Maildienst	300, **600**	P G	X	0.40	4.00	
Jason [1]	PYB	200	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Java PGK [1]	PGK	200	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
J. B. Aug. Kessler [1]	PDV	150-200	Petroleum My. La Corona	300, **600**	P G	X	0.40	4.00	
Johan de Witt [1]	PFJ	Day 500 Night 1,000	"Nederland" Stoomvaart My.	300, **600**, 1,800	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Johanna [1]	PYA	100-150	My. Stooms. Johanna (Jos. de Poorte)	300, **600**	P G	X	0.40	4.00	
Juno PDU [1]	PDU	150-200	Ned. Ind. Tankstoomboot My.	300, **600**	P G	X	0.40	4.00	
Juno TXE	TXE	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Kambangan [1]	PGS	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Kangean [1]	PGP	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Karimata [1]	PGQ	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Karimoen [1]	PGW	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	

Kawi[1]	PFD	200	Rotterdamsche Lloyd	300, 600	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Kediri[1]	PFY	100-150	Rotterdamsche Lloyd	300, 600	P G	X	0.40	4.00
Kelbergen[1]	PIZ	100-150	Furn. Scheepv. & Agent My.	300, 600	P G	X	0.40	4.00
Kennemerland[1]	PYL	200	Kon. Hollandsche Lloyd	300, 600	P G	X	0.40	4.00
Kieldrecht[1]	PXF	200	Ph. van Ommeren	300, 600	P G	X	0.40	4.00
Kilstroom[1]	TVU	150	Holl. Stoomb. My.	300, 600	P G	X	0.40	4.00
Kinderdyk[1]	PYY	200	Solleveld & v. d. Meer	300, 600	P G	X	0.40	4.00
Koningin der Nederlanden[1]	PFO	200	"Nederland" Stoomvaart My.	300, 600	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Koningin Regentes	PAE	400	Navy	300, 600	O	—	—	—
Kortenaer	PAM	100	Navy	300, 600	O	—	—	—
Krakatau[1]	PGL	100-150	Nederland Stoomvaart My.	300, 600	P G	X	0.40	4.00
Lara[1]	PLV	100-150	Ned. Ind. Tankstoomboot My.	300, 600	P G	X	0.40	4.00
Leersum[1]	PZB	200	Vinke & Co.	300, 600	P G	X	0.40	4.00
Lemaire[1]	PMQ	100	Kon. Paketvaart My.	300, 600	P G	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to idday 5 to 7 p.m. 8 to 10 p.m.	0.40	4.00
Limburgia[1]	PXZ	Day 500 Night 1,000	Kon. Hollandsche Lloyd	300, 600	P G	X	0.40	4.00
Lingestroom[1]	PYN	100	Holl. Stoomboot My.	300, 600	P G	X	0.40	4.00
Lombok[1]	PGN	100-150	Nederland Stoomvaart My.	300, 600	P G	X	0.40	4.00
Lynx PBX	PBX	150	Navy	300, 600	O	—	—	—
Maarten Harpertz Tromp	PAB	400	Navy	300, 600	O	—	—	—
Maartensdijk[1]	PDQ	200	Holland Amerika Line	300, 600	P G	X	0.40	4.00
Maasdyk[1]	TVC	200	Holland Amerika Line	300, 600	P G	X	0.40	4.00
Maashaven[1]	PXO	100	Gebr. Van Uden	300, 600	P G	X	0.40	4.00
Maasland[1]	PYM	200	Kon. Hollandsche Lloyd	300, 600	P G	X	0.40	4.00
Macedonia[1]	PZK	100-150	Holl. Alg. Atl. Scheepv. My.	300, 600	P G	X	0.40	4.00
Madioen[1]	PGI	100-150	Rotterdamsche Lloyd	300, 600	P G	X	0.40	4.00
Madoera[1]	TWG	—	"Nederland" Stoomvaart My.	300, 600	P G	X	0.40	4.00
Manoeran[1]	TWH	—	"Nederland" Stoomvaart My.	300, 600	P G	X	0.40	4.00
Mapia[1]	TWI	—	"Nederland" Stoomvaart My.	300, 600	P G	X	0.40	4.00
Marken[1]	PZG	100-150	Rotterdamsche Lloyd	300, 600	P G	X	0.40	4.00
Medan[1]	PGA	100-150	Rotterdamsche Lloyd	300, 600	P G	X	0.40	4.00
Medusa PAR	PAR	60	Navy	300, 600	O	—	—	—
Melchior Treub[1]	PMD	200	Kon Paketvaart My.	300, 600	P G	N	0.40	4.00
Menado[1]	PGB	100-150	Kon. Paketvaart My.	300, 600	P G	X	0.40	4.00
Merauke[1]	PGE	100-150	Kon. Paketvaart My.	300, 600	P G	X	0.40	4.00
Mercurius[1]	TXF	—	Kon. Nederl. Stoomboot My.	300, 600	P G	X	0.40	4.00
Minerva[1]	TXG	—	Kon. Nederl. Stoomboot My.	300, 600	P G	X	0.40	4.00
Mirach[1]	PXI	200	V. Nievelt Goudriaan Stv. My.	300, 600	P G	X	0.40	4.00
Moena[1]	TWK	—	Nederland Stoomvaart. My.	300, 600	P G	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Moerdyk [1]	PYO	200	Solleveld & v. d. Meer	300, **600**	P G	X	0.40	4.00	
Mont Blanc [1]	PDK	50-80	Van de Eb. & Dresselhuys	300, **600**	P G	X	0.40	4.00	
Mydrecht [1]	PXE	150	Ph. van. Ommeren	300, **600**	P G	X	0.40	4.00	
Nereus [1]	TXR	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Newyork PHN [1]	PHN	100-150	American Petroleum Co.	300, **600**	P G	X	0.40	4.00	
Nias [1]	PGR	100-150	Nederland Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Nieuw Amsterdam [1]	PEB	200-250	Holland Amerika Line	300, **600**	P G	N	0.40	4.00	
Noordbrabant	PAJ	200	Navy	300, **600**	O	—	—	—	
Noordam [1]	PEC	200-250	Holland Amerika Line	300, **600**	P G	N	0.40	4.00	
Noorddyk [1]	PYX	200	Solleveld & v. d. Meer	300, **600**	P G	X	0.40	4.00	
Noorderdyk [1]	PDL	200	Solleveld & v. d. Meer	300, **600**	P G	X	0.40	4.00	
Noordwyk [1]	PHG	100	Erhardt & Dekkers	300, **600**	P G	X	0.40	4.00	
Oberon [1]	TXH	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Ocean PDS [1]	PDS	100-150	American Petroleum Co.	300, **600**	P G	X	0.40	4.00	
Ombillin [1]	PMA	200	Kon. Paketvaart My.	300, **600**	P G	N	0.40	4.00	
Onderzeeboot	PBO	20	Navy	300	O	—	—	—	
Oostdyk [1]	PZE	200	Solleveld & v. d. Meer	300, **600**	P G	X	0.40	4.00	
Oostzee [1]	PXU	150	V. Driel's N/V.W. Stoomb. en Transp.	300, **600**	P G	X	0.40	4.00	
Ootmarsum [1]	PXV	200	Vinke & Co.	300, **600**	P G	X	0.40	4.00	
Oranje [1]	PFP	200	"Nederland" Stoomvaart My.	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Oranje Nassau PEM [1]	PEM	150-200	Kon. West Ind. Maildienst.	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 1 to 5 p.m.	0.40	4.00	
Orestes [1]	PYC	200	Kon. Nederl. Stoomb. My.	300, **600**	P G	X	0.40	4.00	
Panter	PBS	150	Navy	300, **600**	O	—	—	—	
Patria [1]	PFT	Day 500 Night 1,000	Rotterdamsche Lloyd	300, **600**, 1,800	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Patroclus [1]	PEU	150-200	Stoomvaart My. Oceaan	300, **600**	P G	X	0.40	4.00	
Peelland [1]	PZW	200	Kon Hollandsche Lloyd	300, **600**	P G	X	0.40	4.00	

Piet Hein	PAO	100	Navy	300, 600	O ..	—	—	—
Plancius[1]	—	—	Kon. Paketvaart Maatschappy ..	300, 600	P G ..	X	0.40	4.00
Poeldyk[1]	TVD	200	Holland Amerika Line	300, 600	P G ..	X	0.40	4.00
Pollux[1]	TXI	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Poolzee	PAG	—	Navy	300, 600	O ..	—	—	—
Prins der Nederlanden PEN[1]	PEN	150-200	Kon. West Ind. Maildienst ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 1 to 5 p.m.	0.40	4.00
Prins der Nederlanden PFQ[1]	PFQ	200	"Nederland" Stoomvaart My. ..	300, 600	P G ..	6 to 9 a.m. 10 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Prinses Juliana[1] ..	PFN	200	"Nederland" Stoomvaart My. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Prins Fred. Hendrik[1] ..	PEK	150-200	Kon. West Ind. Maildienst ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 1 to 5 p.m.	0.40	4.00
Prins Willem I.[1] ..	PEO	200	Kon. West Ind. Maildienst ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Procyon[1]	PXR	125	V. Nievelt Goudriaan Stmv. My.	300, 600	P G ..	X	0.40	4.00
Radja[1]	PHA	100-150	"Nederland" Stoomvaart My. ..	300, 450, 600	P G ..	X	0.40	4.00
Randwijk[1]	PIU	50-80	Erhardt & Dekkers	300, 600	P G ..	X	0.40	4.00
Van Rees[1]	—	200	Kon. Paketvaart My.	300, 600	P G ..	X	0.40	4.00
Rembrandt[1]	PFK	200	"Nederland" Stoomvaart My. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Rijndam[1]	PED	200-250	Holland Amerika Line	300, 600	P G ..	N	0.40	4.00
Rijndijk[1]	PYZ	150	Solleveld & V. D. Meer ..	300, 600	P G ..	X	0.40	4.00
Rijnland[1]	PDN	200	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Rijsbergen[1]	PZI	200	Furness Scheepv. Agentuur My...	300, 600	P G ..	X	0.40	4.00
Rijswijk[1]	PIT	50-80	Erhardt & Dekkers	300, 600	P G ..	X	0.40	4.00
Rindjani[1]	PFH	200	Rotterdamsche Lloyd	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Riouw[1]	PHB	100-150	"Nederland" Stoomvaart My. ..	300, 600	P G ..	X	0.40	4.00
Roepat[1]	PHL	100-150	"Nederland" Stoomvaart My. ..	300, 450, 600	P G ..	X	0.40	4.00
Roggeveen[1]	PMH	150-200	Kon. Paketvaart My.	300, 600	P G ..	N	0.40	4.00
Rondo[1]	PHM	100-150	"Nederland" Stoomvaart My. ..	300, 600	P G ..	X	0.40	4.00
Roode Zee[1]	PIA	100	L. Smit & Co.'s Sleepdienst ..	300, 600	P G ..	X	0.40	4.00
Rotterdam PEA[1] ..	PEA	200-250	Holland Amerika Line	300, 600	P G ..	N	0.40	4.00
Rotterdam PHH[1] ..	PHH	100	American Petroleum Co.	300, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Rotti[1]	PHC	100-150	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Rozenburg[1]	PZS	150-200	Stoomb. "De Goede Verwachting"	300, **600**	P G	X	0.40	4.00	
Rumphius[1]	PMK	100-150	Kon. Paketvaart My.	300, 450, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Salabangka[1]	TWB	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Salawati[1]	TWC	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Saleier[1]	TWA	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Salland[1]	PZJ	200	Kon. Holland che Lloyd	300, **600**	P G	X	0.40	4.00	
Samarinda[1]	PGH	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Saparcea[1]	TWE	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Sarpedon[1]	PET	150-200	Stoomv. My. Oceaan	300, **600**	P G	X	0.40	4.00	
Saturnus[1]	TXJ	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Schiedijk[1]	PIQ	150-200	Holland Amerika Line	300, **600**	P G	X	0.40	4.00	
Selene[1]	PDW	150-200	Petroleum My. La Corona	300, **600**	P G	X	0.40	4.00	
Sembilan[1]	TWF	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Sitoga[1]	—	—	Kon. Paketvaart Maatschappy	300, **600**	P G	X	0.40	4.00	
Sigli[1]	—	—	Kon. Paketvaart Maatschappy	300, **600**	P G	X	0.40	4.00	
Simaloer[1]	TWD	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Sindoro[1]	PFE	200	Rotterdamsche Lloyd	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Singkep[1]	TWJ	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Sirrah[1]	PXJ	200	V. Nievelt Goudriaan Stmv. My.	300, **600**	P G	X	0.40	4.00	
Sitoebondo[1]	PHT	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Slace[1]	—	—	Kon. Paketvaart Maatschappy	300, **600**	P G	X	0.40	4.00	
Sliedrecht[1]	PYD	150	Ph. van. Ommeren	300, **600**	P G	X	0.40	4.00	
Sloet V. D. Beele[1]	—	200	Kon. Paketvaart My.	300, **600**	P G	X	0.40	4.00	
Sloterdijk[1]	TVE	200	Holland Amerika Line	300, **600**	P G	X	0.40	4.00	
Soemba[1]	TWL	—	"Nederland" Stoomvaart My.	300, **600**	P G	X	0.40	4.00	
Soerakarta[1]	PGJ	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Soestdijk[1]	PHO	200	Holland Amerika Line	300, **600**	P G	X	0.40	4.00	
Sommelsdijk[1]	PEW	100-150	Holland Amerika Line	300, **600**	P G	X	0.40	4.00	
Stad Amsterdam[1]	PZR	150-200	Stoom My. "Stad Amsterdam"	300, **600**	P G	X	0.40	4.00	

Stad Arnhem[1]	PII	200	Arnhemsche Scheep. My... ..	300, 600	P G ..	X	0.40	4.00
Stad Dordrecht[1] ..	PZP	150-200	Stoomv. My. " Stad Dordrecht "	300, 600	P G ..	X	0.40	4.00
Stad Valkenburg[1] ..	PIG	200	Stoomv. My. Zuid Holland ..	300, 600	P G ..	X	0.40	4.00
Stad Zaandam[1] ..	PIF	200	Stoomv. My. " Stad Zalt Bommel "	300, 600	P G ..	X	0.40	4.00
Stad Zalt Bommel[1] ..	PZQ	150-200	Stoomv. My. " Stad Zalt Bommel "	300, 600	P G ..	X	0.40	4.00
Stad Zwolle[1]	PIE	200	Stoomv. My. " Stad Zalt Bommel "	300, 600	P G ..	X	0.40	4.00
Stella[1]	TXK	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Stuyvesant[1]	PEJ	200-250	Kon. West. Ind. Maildienst ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Sumatra PGM[1] ..	PGM	100-150	" Nederland " Stoomvaart My. ..	300, 600	P G ..	X	0.40	4.00
Swartenhondt[1] ..	—	—	Kon. Paketvaart Maatschappy ..	300, 600	P G ..	X	0.40	4.00
Tabanan[1]	PFF	200	Rotterdamsche Lloyd	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Tambora[1]	PFC	200	Rotterdamsche Lloyd .. .	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Tantalus[1]	PES	150-200	Stoomv. My. Oceaan	300, 600	P G ..	X	0.40	4.00
Tasman[1]	—	200	Kon. Paketvaart My.	300, 600	P G ..	X	0.40	4.00
Ternate[1]	PGF	100-150	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Texelstroom[1]	TVV	150	Holl. Stoomb. My.	300, 600	P G ..	X	0.40	4.00
Thames[1]	PHX	150-200	Internationale Sleepdienst ..	300, 600	P G ..	X	0.40	4.00
Themisto[1]	PXB	50-80	My. Zeevaart (Hudig & Veder) ..	300, 600	P G ..	X	0.40	4.00
Thuban[1]	PXP	125	V. Nievelt Goudriaan Stoomv. My.	300, 600	P G ..	X	0.40	4.00
Tjibesar[1]	—	—	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00
Tjibodas[1]	PLL	100-120	Java, China, Japan Line	300, 600	P G ..	N	0.40	4.00
Tjikalong[1]	—	200	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00
Tjikandi[1]	—	—	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00
Tjikarong[1]	—	200	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00
Tjikembang[1]	PLH	200	Java, China, Japan Line	300, 600	P G ..	N	0.40	4.00
Tjikini[1]	PLM	100-200	Java, China, Japan Line	300, 600	P G ..	N	0.40	4.00
Tjilatjap[1]	PLP	150	Java, China, Japan Line	300, 600	P G ..	7 to 8 a.m. 9 a.m. to midday 2 to 3 p.m. 5 to 6 p.m. 8 to 11 p.m.	0.40	4.00
Tjileboet[1]	PLQ	150-200	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00
Tjiliwong[1]	PLN	100-200	Java, China, Japan Line	300, 600	P G ..	N	0.40	4.00
Tjimanoek[1]	PLJ	200	Java, China, Japan Line	300, 600	P G ..	N	0.40	4.00
Tjipanas[1]	PLO	150	Java, China, Japan Line	300, 600	P G ..	7 to 8 a.m. 9 a.m. to midday 2 to 3 p.m. 5 to 6 p.m. 8 to 11 p.m.	0.40	4.00
Tjisalak[1]	PLR	150-200	Java, China, Japan Line	300, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Tjisondari [1]	PLI	200	Java, China, Japan Line	300, **600**	P G	N	0.40	4.00	
Tjitaroem [1]	PLK	200	Java, China, Japan Line	300, **600**	P G	N	0.40	4.00	
Tosari [1]	PIO	100-150	Rotterdamsche Lloyd	300, **600**	P G	X	0.40	4.00	
Triton [1]	TXL	—	Kon. Nederl. Stoomboot My.	300, **600**	P G	X	0.40	4.00	
Trompenb rg [1]	PZF	—	Vinke & Co.	300, **600**	P G	X	0.40	4.00	
Turbinia PHR [1]	PHR	100-150	Ruys en Zonen	300, **600**	P G	X	0.40	4.00	
Ubbergen [1]	PYF	100	Furn. Scheep. V. Agent. My.	300, **600**	P G	X	0.40	4.00	
Ulysses [1]	PYV	200	Kon. Nederl. Stoomb. My.	300, **600**	P G	X	0.40	4.00	
Van Cloon	PMJ	100-150	Kon Paketvaart My.	300, 450, **600**	P G	6 to 8 a.m. 9 a.m. to noon 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	
Van der Hagen	PMN	100	Kon. Paketvaart My.	300, **600**	P G	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 5 to 7 p.m. 8 to 10 p.m.	0.40	4.00	
Van Hoorn	PMP	100	Kon. Paketvaart My.	300, **600**	P G	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 5 to 7 p.m. 8 to 10 p.m.	0.40	4.00	
Van Imhoff	—	200	Kon. Paketvaart My.	300, **600**	P G	X	0.40	4.00	
Van Linschoten	—	200	Kon. Paketvaart My.	300, **600**	P G	X	0.40	4.00	
Van Overstraeten	PME	200	Kon. Paketvaart My.	300, **600**	P G	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 8 to 10 p.m.	0.40	4.00	
Van Rensselaer	PEQ	200-250	Kon. West Ind. Maildienst	300, **600**	P G	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00	

Van Spilbergen ..	PMM	100-150	Kon. Paketvaart My.	300, 600	P G ..	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 5 to 7 p.m. 8 to 10 p.m.	0.40	4.00
Van Waerwyk ..	PMB	150	Kon. Paketvaart My. ..	300, 600	P G ..	3 to 4 a.m. 6 to 8 a.m. 9 a.m. to midday 8 to 10 p.m.	0.40	4.00
Van der Wyck ..	—	—	Kon. Paketvaart My.	300, 600	P G ..	X	0.40	4.00
Veenbergen[1]	PHS	100-150	Kon. Nederl. Stoomb. My. ..	300, 600	P G ..	X	0.40	4.00
Veendijk[1]	PIR	150-200	Holland Amerika Line	300, 600	P G ..	X	0.40	4.00
Vesta[1]	TXM	—	Kon. Nederl. Stoomb. My. ..	300, 600	P G ..	X	0.40	4.00
Vondel[1]	PFM	200	"Nederland" Stoomvaart My. ..	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Vos	PBV	150	Navy	300, 600	O ..	—	—	—
Vulcanus	TXN	—	Kon. Nederl. Stoomboot My. ..	300, 600	P G ..	X	0.40	4.00
Waaldijk[1]	PGY	100-150	Holland Amerika Line	300, 600	P G ..	X	0.40	4.00
Waalstroom[1]	TVW	150	Holl. Stoomb. My.	300, 600	P G ..	X	0.40	4.00
Walcheren[1]	PEZ	100-150	Rotterdamsche Lloyd	300, 600	P G ..	X	0.40	4.00
Waterland[1]	PZN	200	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Westerdijk PGZ[1] ..	PGZ	200	Holland Amerika Line	300, 450, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Westerdijk PZT[1] ..	PZT	200	Solleveld & V. D. Meer	300, 600	P G ..	X	0.40	4.00
Wieldrecht[1]	PYE	150	Ph. Van Ommeren	300, 600	P G ..	X	0.40	4.00
Wilis[1]	PFG	200	Rotterdamsche Lloyd	300, 600	P G ..	6 to 8 a.m. 9 a.m. to midday 2 to 6 p.m. 8 to 10 p.m.	0.40	4.00
Willem V. Driel S R[1] ..	PHW	100-150	V. Driel's N/V. W. Stoom. en Transp.	300, 600	P G ..	X	0.40	4.00
Winterswijk[1]	PIS	50-80	Erhardt & Dekkers	300, 600	P G ..	X	0.40	4.00
Witte Zee[1]	PIC	75-125	L. Smit & Co.'s Sleepdienst ..	300, 600	P G ..	X	0.40	4.00
Wolf PBW	PBW	150	Navy	300, 600	O ..	—	—	—
Yildum[1]	PXM	125	V. Nievelt, Groudriaan Stoom. My.	300, 600	P G ..	X	0.40	4.00
Yseldijk[1]	PIP	150-200	Holland Amerika Line	300, 600	P G ..	X	0.40	4.00
Zaandijk[1]	PIJ	200	Holland Amerika Line	—	P G ..	—	0.40	4.00
Zaanland[1]	PZO	200	Kon. Hollandsche Lloyd	300, 600	P G ..	X	0.40	4.00
Zaanstroom[1]	TVX	150	Holl. Stoomb. My.	300, 600	P G ..	X	0.40	4.00
Zeehond	PAZ	100	Navy	300, 600	O ..	—	—	—
Zeeland PZV[1] ..	PZV	150	Bureau Wysmuller	300, 600	P G ..	X	0.40	4.00
Zeeland PAF	PAF	200	Navy	300, 600	O ..	—	—	—
Zeelandia[1]	PEI	200-250	Kon. Hollandsche Lloyd	300, 600	P G ..	N	0.40	4.00
Zuid-Holland[1] ..	PZH	—	Scheepv. & Steenk. My.	300, 600	P G ..	X	0.40	4.00
Zuiderdyk[1]	PHP	200	Holland Amerika Line	300, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
HOLLAND—*contd.*							Francs.	Francs.	
Zwarte Zee PID [1]	PID	75-125	L. Smit & Co.'s Sleepdienst.	300, **600**	P G	X	0.40	4.00	
Zwarte Zee PXT [1]	PXT	100-150	V. Driel's N/V. W. Stoomb. Transp.	300, **600**	P G	—	0.40	4.00	
Zijldijk [1]	TVF	200	Holland Amerika Line	300, **600**	P G	X	0.40	4.00	
HONDURAS (REPUBLIC OF)									
Tegucifalpa [1]	VB	—	Vaccaro Bros. & Co.	—	P G	X	0.40	—	[1] Operated and controlled by the Marconi Wireless Tel. of America, New York, on behalf of the Marconi International Marine Com. Co., London
Yoro [1]	VY	—	Vaccaro Bros. & Co.	—	P G	X	0.40	—	
HONG KONG									
Aspinet [2]	GTY	125	Standard Trans. Co., Ltd.	300, **600**	P	X	—	—	[1] Operated and controlled by the Marconi International Mar. Com. Co., Ltd., London [2] Operated and controlled by the Marconi Wireless Tel. Co. of America on behalf of the Marconi International Marine Com. Co., Ltd., London [3] Accounts are settled through Siemens Bros. & Co., Ltd., Woolwich, London
Hermeline [1]	YUF	—	Furness, Withy & Co., Ltd.	—	—	—	—	—	
Laertes [1]	MYX	—	A. Holt & Co.	—	—	—	—	—	
Nile VRE [3]	VRE	300	China Pacific S.S. Co.	300, **600**	P G	N	0.40	—	
Samoset [2]	NUU	125	Standard Trans. Co., Ltd.	300, **600**	P	X	—	—	
Satanta [2]	KZS	125	Standard Trans. Co., Ltd.	300, **600**	P	X	—	—	
Wapello [2]	—	125	Standard Transport Co., Ltd.	300, **600**	P	X	—	—	
INDIA									
Dara [2]	BSI	—	Bombay & Persia S.N. Co., Ltd.	—	—	—	—	—	[1] Operated and controlled by the owners [2] Operated by the Marconi International Marine Com. Co., Ltd., London
Dufferin [1]	VUB	250	Government (R. Ind. Marine)	300, **600**, 1,000	P G	N	0.40	—	
Gregory Apcar [2]	VUF	—	British India S.N. Co.	—	—	—	—	—	
Hardinge [1]	VUC	250	Government (R. Ind. Marine)	300, **600**, 1,800	P G	N	0.40	—	
Japan [2]	VUG	—	British India S.N. Co.	—	—	—	—	—	
Lightning [2]	VUL	—	British India S.N. Co.	—	—	—	—	—	

Ship	Call		Owner					
Loyalty[2]	ZCI	—	Scindia S.N. Co., Ltd.	—	—	—	—	—
Noderi[2]..	VUK	—	British India S.N. Co.	—	—	—	—	—
Northbrook[1]	VUD	200	Government (R. Ind. Marine) ..	300, 430, 600, 1,000	P G ..	N	0.40	—
Seang Bee[2]	VJO	—	Lim Chin Tsong	—	—	—	—	—
Shuja[2]	VUS	—	Bombay & Persia S.N. Co. ..	—	—	—	—	—
ITALY								
Ada[1]	IOW	—	Alessandro Aboaf...	—	—	—	—	—
Ada O[1]	IAA	—	Ente Trasporto Cotoni	—	—	—	—	—
Adda[1]	IPG	—	Gestione a Vapore Adda	—	—	—	—	—
Adriatico[1]	IEO	190	Ferrovie dello Stato	300, 600	P ..	X	0.40	—
Affinita[1]	IOH	—	Lloyd Pacifico	—	—	—	—	—
Africa[1]	IAZ	—	Lloyd Triestino	—	—	—	—	—
Agatocle[1]	IWC	—	Cappuccio Carmelo	—	—	—	—	—
Agios Georgios[1] ..	ITM	—	Marittime Italiana	—	—	—	—	—
Agnello Ciampa[1] ..	IXY	—	Francesco Ciampa..	—	—	—	—	—
Agordat..	IRK	—	Navy	—	—	—	—	—
Alacrita[1]	IOL	—	Lloyd Pacifico	—	—	—	—	—
Albania[1]	IOM	—	Soc. It. Serv. Marittimi	—	—	—	—	—
Albano[1]	IMQ	—	Servizi Marit imi	—	—	—	—	—
Albaro[1]..	IAB	—	Tito Campanella	—	—	—	—	—
Alberto Cavalletto[1] ..	ILF	—	Ferrovie dello Stato	—	—	—	—	—
Alberto Treves[1] ..	IWG	—	Soc. Ven. Nav. a Vapore ..	—	—	—	—	—
Alcana[1]..	IXB	—	Lloyd Mediterraneo	—	—	—	—	—
Alcazar[1]	IWZ	—	Merli e Lugaro	—	—	—	—	—
Alessandro A.[1].. ..	IOX	—	Alessandro Abo f.	—	—	—	—	—
Alpino	IIE	—	Navy	—	—	—	—	—
Amalfi[1]	IMD	—	Ferrovie dello Stato	—	—	—	—	—
America[1]	IZA	270	Nav. Generale Italiana	300, 600	P G ..	N	0.40	—
Amerigo Vespucci ..	IGG	—	Navy	—	—	—	—	—
Amista[1]	IOI	—	Lloyd del Pacifico	—	—	—	—	—
Ammiraglio Magnaghi	IGR	—	Navy	—	—	—	—	—
Ammiraglio Saint Bon	IHV	—	Navy	—	—	—	—	—
Ancona[1]	ILC	—	Ferrovie dello Stato	—	—	—	—	—
Andrea[1]	IXG	—	Dall' Orso e Co.	—	—	—	—	—
Andrea Doria	IHA	—	Navy	—	—	—	—	—
Angelica Accame[1] ..	IPH	—	Flli. Accame di Luigi	—	—	—	—	—
Angelo Brunetti[1] ..	IMY	—	Ferrovie dello Stato	—	—	—	—	—
Angelo Scarsellini[1] ..	IUK	—	Ferrovie dello Stato	—	—	—	—	—
Angelo Toso[1]	INN	—	Societa Nazionale	—	—	—	—	—
Angelo Bondi[1].. ..	IAP	—	Lloyd Mediterraneo	—	—	—	—	—
Animoso	IID	—	Navy	—	—	—	—	—
Ansaldo 1[1]	IXV	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo 2[1]	IXP	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo 3[1]	IUR	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo 4[1]	ILY	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo 5[1]	ILT	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo 6[1]	IAC	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo S. Giorgio 1[1]	IVI	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo S. Giorgio 2[1]	IAH	—	Soc. Nazionale di Nav.	—	—	—	—	—
Ansaldo S. Giorgio 3[1]	IAI	—	Soc. Nazionale di Nav.	—	—	—	—	—

[1] Operated by the Compania Internazionale Marconi per le Comunicazioni Marittime, Rome

[2] Operated and controlled by the owner

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
ITALY—*contd.*									
Antonietta Accame [1]	IOF	—	Luigi Antioco Flli. Accame	—	—	—	—	—	
Antonio [1]	IWL	—	Lloyd Mediterraneo	—	—	—	—	—	
Aquilone	IIW	—	Navy	—	—	—	—	—	
Archimede	IFT	—	Navy	—	—	—	—	—	
Ardente	IIB	—	Navy	—	—	—	—	—	
Ardito	IIA	—	Navy	—	—	—	—	—	
Argentina [1]	ITP	—	Flli. Cosulich Trieste	—	—	—	—	—	
Armando [1]	ITO	—	Nav. Generale Italiana	—	—	—	—	—	
Arnaldo da Brescia [1]	IMK	—	Ferrovie dello Stato	—	—	—	—	—	
Artigliere	IIG	—	Navy	—	—	—	—	—	
Assiria [1]	IOY	—	Soc. Meritt. Italiana	—	—	—	—	—	
Aster [1]	IUY	—	Edoardo Mazz	—	—	—	—	—	
Atlanta [1]	IEN	—	Ferrovie dello Stato	—	—	—	—	—	
Attualita [1]	IAR	—	Lloyd Pacifico	—	—	—	—	—	
Audace	IIC	—	Navy	—	—	—	—	—	
Aurania [1]	IVA	—	Lloyd Mediterran o	—	—	—	—	—	
Bagnoli [1]	IXO	—	Lloyd Mediterran o	—	—	—	—	—	
Barbarigo [1]	IUZ	—	S. Ven. Nav. a Vapore	—	—	—	—	—	
Baron Call [1]	IXU	—	Lloyd Triestino	—	—	—	—	—	
Basilicata	IKL	—	Navy	—	—	—	—	—	
Bastia [1]	ILY	—	Ferrovie dello Stato	—	—	—	—	—	
Battinin Accame [1]	IOD	—	Salvatore a Emanuele Flli. Accame	—	—	—	—	—	
Bayonne [1]	ILB	190	Columbia	300, **600**	P	X	0.40	—	
Belluno [1]	ILP	—	Ferrovie dello Stato	—	—	—	—	—	
Belvedere [1]	ITX	—	Flli. Cosulich	—	—	—	—	—	
Bengasi	IGI	—	Navy	—	—	—	—	—	
Bengasi 2 [1]	IAW	—	Servizi Marittimi	—	—	—	—	—	
Berenice [1]	IYE	—	Sicilia	—	—	—	—	—	
Bersagliere	IIH	—	Navy	—	—	—	—	—	
Bologna [1]	ITB	190	La Veloce	300, **600**	P G	N	0.40	—	
Bolsena [1]	ILA	—	Servizi Marittimi	—	—	—	—	—	
Bolzaneto [1]	IOK	—	Lloyd Mediterraneo	—	—	—	—	—	
Borea	III	—	Navy	—	—	—	—	—	
Bormida [1]	IOO	—	Servizi Marittimi	—	—	—	—	—	
Brasile [1]	IED	190	Soc. Transoceanica	300, **600**	P G	X	0.40	—	
Brenta [1]	IAF	—	Nav. Gén. Italiana	—	—	—	—	—	
Brento [1]	IOU	—	Soc. Amatori Liguri Lombardi	—	—	—	—	—	
Brescia [1]	ILZ	—	Ferrovie dello Stato	—	—	—	—	—	

Bronte	IGA	—	Navy	—	—	—	—	—	
Bucovina[1]	—	—	Lloyd Triestino	—	—	—	—	—	
Bulgaria[1]	IOP	—	Servizi Marittimi	—	—	—	—	—	
Caboto[1]..	ITJ	—	Soc. Venez. Nav. a Vapore ..	—	—	—	—	—	
Cagliari[1]	INK	140	Sicilia	300, 600	P ..	X	0.40	—	
Calabria IKN	IKN	—	Navy	—	—	—	—	—	
Calimeris[1]	IUQ	—	Soc. Naz. di Navigazione ..	—	—	—	—	—	
Campania IKM ..	IKM	—	Navy	—	—	—	—	—	
Campania IYQ[1] ..	IYQ	—	Luigi Pittaluga	—	—	—	—	—	
Cannosa[1]	IVQ	—	Soc. Libera Triestina	—	—	—	—	—	
Capitano Verri ..	IGS	—	Navy	—	—	—	—	—	
Caprera[1]	IWI	—	Nav. Gén. Italiana	—	—	—	—	—	
Capri[1]	ING	—	Marittimi Italiana	—	—	—	—	—	
Carabiniere	IIJ	—	Navy	—	—	—	—	—	
Cariddi[1]	IMC	—	Sicilia	—	—	—	—	—	
Carignano[1]	IOR	—	Lloyd Sabaudo	—	—	—	—	—	
Carlo Alberto	IGU	—	Navy	—	—	—	—	—	
Carlo Pisacane[1] ..	ILK	—	Ferrovie dello Stato	—	—	—	—	—	
Caserta[1]	IYZ	190	Nav. Generale Italiana	300, 600	P G ..	N	0.40	—	
Castelporziano[1] ..	ITW	—	Lloyd Sabaudo	—	—	—	—	—	
Catania[1]	IMJ	—	Ferrovie dello Stato	—	—	—	—	—	
Caterina Accame[1] ..	IPO	—	Flli. Accame di Luigi	—	—	—	—	—	
Cavi[1]	IXD	—	Soc. Sbar. Imbar. a Tras. ..	—	—	—	—	—	
Cerea[1]	ITL	—	Soc. Prod. Ch. Colla Conc. Roma Alta Italia	—	—	—	—	—	
Cervino[1]	ILR	—	Ferrovie dello Stato	—	—	—	—	—	
Cetina[1]	IVP	—	Libera Triestina	—	—	—	—	—	
Chile[1]	IOJ	—	Lloyd Pacifico	—	—	—	—	—	
Ciclope	IGQ	—	Navy	—	—	—	—	—	
Circe[1]	ITZ	—	Nav. Generale Italiana	—	—	—	—	—	
Città di Bengasi[1] ..	IUI	—	Ferrovie dello Stato	—	—	—	—	—	
Città di Cagliari[1] ..	IAK	—	Ferrovie dello Stato	—	—	—	—	—	
Città di Catania[1] ..	IET	190	Ferrovie dello Stato	300, 600	P G ..	N	0.40	—	
Città di Milano ..	IGJ	—	Navy	—	—	—	—	—	
Città di Palermo[1] ..	IWE	—	S. An. Genovese Ar. e Trasp. ..	—	—	—	—	—	
Città di Porto Maurizio[1] ..	IWX	—	Felice Bensa	—	—	—	—	—	
Città di Siracusa[1] ..	IES	190	Ferrovie dello Stato	300, 600	P G ..	N	0.40	—	
Città di Trieste[1] ..	INE	190	Sicilia	300, 600	P ..	X	0.40	—	
Città di Tripoli[1] ..	INP	190	Sicilia	300, 600	P ..	X	0.40	—	
Città di Venezia[1] ..	IEF	—	S. An. Adriatica	—	—	—	—	—	
Cleopatra[1]	ILI	—	—	—	—	—	—	—	
Clio[1]	IUB	—	Nav. Generale Italiana	—	—	—	—	—	
Coatit	IKS	—	Navy	—	—	—	—	—	
Cogne[1]	IMF	—	Soc. Nazionale	—	—	—	—	—	
Colomba[1]	IXH	—	Lloyd Mediterraneo	—	—	—	—	—	
Coltano[1]	IZF	—	La Polare	—	—	—	—	—	
Columbia[1]	IWM	—	Flli. Cosulich	—	—	—	—	—	
Confidenza[1]	ITC	—	Corrado Andrea	—	—	—	—	—	
Conte di Cavour ..	IHD	—	Navy	—	—	—	—	—	
Corazziere	IIK	—	Navy	—	—	—	—	—	
Costantinopoli[1] ..	IOQ	—	Soc. Ital. Ser. Marittimi	—	—	—	—	—	
Crema[1]	ILG	—	Ferrovie dello Stato	—	—	—	—	—	
Cuzco[1]	IZS	—	Soc. An Nafra (Milano)	—	—	—	—	—	
Dandolo	IHH	—	Navy	—	—	—	—	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
ITALY—*contd.*									
Dante Alighieri IUH [1]	IUH	270	Transatlantica Italiana	300 **600**	P G	N	0.40	—	
Dante Alighieri IHC	IHC	—	Navy	—	—	—	—	—	
D'Aosta [1]	IZB	—	La Polare	—	—	—	—	—	
Dardo	IIL	—	Navy	—	—	—	—	—	
Derna [1]	IAX	—	Servizi Marittimi	—	—	—	—	—	
Dinnamare [1]	IEY	—	Transoceanica	—	—	—	—	—	
Doen Saumd [1]	ITD	—	Ferrovie dello Stato	—	—	—	—	—	
Dora Baltea [1]	ITK	—	Alta Italia	—	—	—	—	—	
Duca D'Aosta [1]	IZT	270	Nav. Generale Italiana	300, **600**	P G	N	0.40	—	
Duca degli Abruzzi [1]	IZZ	270	Nav. Generale Italiana	300, **600**	P G	N	0.40	—	
Duilio	IHB	—	Navy	—	—	—	—	—	
Egadi [1]	IPA	—	Marittima Italiana	—	—	—	—	—	
Elba	IKI	—	Navy	—	—	—	—	—	
Elba [1]	IOC	—	Lloyd Mediterraneo	—	—	—	—	—	
Electra	ICCM	—	Senatore Guglielmo Marconi, G.C.V.O., LL.D., D.Sc.	—	—	—	—	—	
Elettrico [1]	IYX	—	Servizi Marittimi	—	—	—	—	—	
Eliopoli [1]	IWU	—	Fratelli Bozzo	—	—	—	—	—	
Emanuele Filiberto	IHW	—	Navy	—	—	—	—	—	
Entella [1]	INW	140	Sicilia	300, **600**	P	X	0.40	—	
Eridano	IGO	—	Navy	—	—	—	—	—	
Eritrea	IGX	—	Navy	—	—	—	—	—	
Esperia IZP [1]	IZP	—	Sicilia	—	—	—	—	—	
Esperia IZX [1]	IZX	—	Servizi Marittimi	—	—	—	—	—	
Espero	IIM	—	Navy	—	—	—	—	—	
Espero [1]	IUU	—	Ghirardi Genova	—	—	—	—	—	
Etna IKG	IKG	—	Navy	—	—	—	—	—	
Etna IWJ [1]	IWJ	—	Nav. Generale Italiana	—	—	—	—	—	
Etruria IKP	IKP	—	Navy	—	—	—	—	—	
Etruria INQ [1]	INQ	140	Sicilia	300, **600**	P	X	0.40	—	
Eugenio Cantoni [1]	IVG	—	Ente Trasporto Cotoni	—	—	—	—	—	
Euro	IIN	—	Navy	—	—	—	—	—	
Europa IEE [1]	IEE	270	La Veloce	300, **600**	P G	N	0.40	—	
Fagernes [1]	IPQ	—	S. Naz. di Navigazione	—	—	—	—	—	
Favignana [1]	IMV	—	Marittimi Italiana	—	—	—	—	—	
Febo [1]	IZW	—	Vassallo e Narizzano	—	—	—	—	—	
Fede [1]	IPF	—	Becchi e Calcagno	—	—	—	—	—	
Ferdinando Palasciano [1]	IAM	—	Ferrovie dello Stato	—	—	—	—	—	

Ferencz Ferdinand[1]	IPU	—	Adria Fiume	—	—	—	—	—	
Ferencz Joseph Kiraly[1]	IPT	—	Adria Fiume	—	—	—	—	—	
Ferrara[1]	ILU	—	Ferrovie dello Stato	—	—	—	—	—	
Fert[1]	IYL	—	Alta Italia	—	—	—	—	—	
Fiume[1]	IAJ	—	Nav. Generale Italiana	—	—	—	—	—	
Flavio Gioja	IGE	—	Navy	—	—	—	—	—	
Francesca[1]	ITQ	—	Flli. Cosulich Trieste	—	—	—	—	—	
Francesco Ciampa[1]	IWD	—	F. S. Ciampa Piano de Sorento	—	—	—	—	—	
Francesco Furruccio[1]	IHZ	—	Navy	—	—	—	—	—	
Fratelli Bandiera[1]	ILX	—	Ferrovie dello Stato	—	—	—	—	—	
Fuciliere	IIO	—	Navy	—	—	—	—	—	
Fulmine	IIP	—	Navy	—	—	—	—	—	
Garibaldi IUA[1]	IUA	190	Transatlantica Italiana	300,000	P G	N	0.40	—	
Garibaldino	IIQ	—	Navy	—	—	—	—	—	
Gerolamo Ullao	IEJ	—	Ferrovie dello Stato	—	—	—	—	—	
Giglio[1]	IXK	—	Edoardo Mazza	—	—	—	—	—	
Giovanni G[1]	IWQ	—	Lloyd Mediterraneo	—	—	—	—	—	
Giovanni Bausan	IGD	—	Navy	—	—	—	—	—	
Giove[1]	IMG	—	Ferrovie dello Stato	—	—	—	—	—	
Giuditta[1]	IWS	—	Ravano e Corrado	—	—	—	—	—	
Giuliana	IGN	—	Navy	—	—	—	—	—	
Giulio Cesare IHE	IHE	—	Navy	—	—	—	—	—	
Giulio Cesare IXR[1]	IXR	—	P. Vitulli e Montaruli	—	—	—	—	—	
Giuseppe Beraldo[1]	IXI	—	Flli. Beraldo	—	—	—	—	—	
Giuseppe Verdi[1]	IUV	270	Transatlantica Italiana	300,000	P G	N	0.40	—	
Goffredo Mameli[1]	IUD	—	Ferrovie dello Stato	—	—	—	—	—	
Goito	IKU	—	Navy	—	—	—	—	—	
Gonzaga[1]	IML	—	Soc. Naz. di Navigazione	—	—	—	—	—	
Granatiere	IIR	—	Navy	—	—	—	—	—	
Graz[1]	IPD	—	Lloyd Triestino	—	—	—	—	—	
Helouan[1]	IVY	—	Lloyd Triestino	—	—	—	—	—	
Hungaria[1]	IVK	—	Lloyd Triestino	—	—	—	—	—	
Iberia[1]	IPC	—	Fed. Cons. Agrari	—	—	—	—	—	
Ida[1]	IWB	—	Soc. It. Arm. e Navigazione	—	—	—	—	—	
Impavido	IIV	—	Navy	—	—	—	—	—	
Indiana[1]	IYI	190	Nav. Generale Italiana	300,000	P G	N	0.40	—	
Indomito	IIS	—	Navy	—	—	—	—	—	
Innsbruch[1]	IPV	—	Lloyd Triestino	—	—	—	—	—	
Insidioso	IIT	—	Navy	—	—	—	—	—	
Intrepido	IIU	—	Navy	—	—	—	—	—	
Iride	IKT	—	Navy	—	—	—	—	—	
Iris[1]	IOZ	—	Edoardo Mazza	—	—	—	—	—	
Irrequieto	IIX	—	Navy	—	—	—	—	—	
Ischia[1]	INZ	190	Marittima Italiana	300,000	P	X	0.40	—	
Italia IZI[1]	IZI	190	Transoc anica	300,000	P G	X	0.40	—	
Josto[1]	ITY	—	Sicilia	—	—	—	—	—	
Juno[1]	IUF	—	Nav. Generale Italiana	—	—	—	—	—	
Kerka[1]	IVO	—	Soc. Nav. Libera Triestina	—	—	—	—	—	
Labor[1]	IPL	—	Benedetto Lagorara	—	—	—	—	—	
Lamia L.[1]	—	—	—	—	—	—	—	—	
Lampo IIY	IIY	—	Navy	—	—	—	—	—	
Lampo ILL[1]	ILL	190	Columbia	300,000	P	X	0.40	—	
Lanciere	IIZ	—	Navy	—	—	—	—	—	
Laura[1]	ITT	—	Vincenzo de Luca	—	—	—	—	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
ITALY—*contd.*							Francs.	Francs.	
Legnano[1]	IUL	—	Ferrovie dello Stato	—	—	—	—	—	
Leopolis[1]	IZR	—	Lloyd Triestino	—	—	—	—	—	
Lepanto[1]	IEX	—	Soc. Venez. di Nav. a Vapore	—	—	—	—	—	
Libia	IKH	—	Navy	—	—	—	—	—	
Liguria	IKQ	—	Navy	—	—	—	—	—	
Livietta[1]	IXL	—	Dall'Orso & Co.	—	—	—	—	—	
Lombadia	IKO	—	Navy	—	—	—	—	—	
Loredano[1]	IUX	—	Soc. Ven. di Nav. a Vapore	—	—	—	—	—	
Lucania I[1]	IPI	—	Soc. Lucania	—	—	—	—	—	
Luciano Manara[1]	IEI	—	Ferrovie dello Stato	—	—	—	—	—	
Luigino Accame[1]	IVB	—	Soc. Maremola	—	—	—	—	—	
Maddalena[1]	IWK	—	Gaetano Camogli	—	—	—	—	—	
Majella[1]	ILN	—	Ferrovie dello Stato	—	—	—	—	—	
Marco Minghetti[1]	INH	140	Sicilia	300, **600**	P	X	0.40	—	
Marco Polo	IGY	—	Navy	—	—	—	—	—	
Maria C.[1]	IYW	—	Odero Attilio	—	—	—	—	—	
Marina IVN[1]	IVN	—	Libera Triestina	—	—	—	—	—	
Marina IMO[1]	IMO	—	N. Odero fu Alessandro	—	—	—	—	—	
Mariquita[1]	IWR	—	Lloyd Mediterraneo	—	—	—	—	—	
Marsala IKE	IKE	—	Navy	—	—	—	—	—	
Marsala IPS[1]	IPS	—	Ferrovie dello Stato	—	—	—	—	—	
Marte[1]	IVF	—	Soc. Ligure di Armamento	—	—	—	—	—	
Masaniello[1]	IEW	—	Transoceanica	—	—	—	—	—	
Melpomene[1]	IVU	—	—	—	—	—	—	—	
Memfi[1]	IPZ	—	Sicilia	—	—	—	—	—	
Meran[1]	IVS	—	—	—	—	—	—	—	
Metlaoni[1]	IYO	—	Devoto Clorialdo	—	—	—	—	—	
Michelangelo[1]	IXM	—	Dall'Orso & Co.	—	—	—	—	—	
Milano[1]	INM	110	Servizi Marittimi	300, **600**	P G	X	0.40	—	
Milazzo[1]	IEP	—	Transoceanica	—	—	—	—	—	
Minerva IKX	IKX	—	Navy	—	—	—	—	—	
Minerva IXJ[1]	IXJ	—	Soc. Ligure di Armamento	—	—	—	—	—	
Misurata	IGP	—	Navy	—	—	—	—	—	
Moncalieri[1]	IWW	—	Lloyd Sabaudo	—	—	—	—	—	
Moncenisio ILO[1]	ILO	—	Ferrovie dello Stato	—	—	—	—	—	
Moncenisio IXT[1]	IXT	—	Alta Italia	—	—	—	—	—	
Monginevro	ITG	—	Alta Italia	—	—	—	—	—	
Montebello	IKZ	—	Navy	—	—	—	—	—	

Monte Bianco[1] ..	ILD	—	Ferrovie dello Stato	—	—	—	—	—
Monte Grappa[1] ..	IEB	—	Cons. Venez. di Arm. e Navigaz...	—	—	—	—	—
Montello[1]	INA	—	Cons. Venez. di Arm. e Navigaz...	—	—	—	—	—
Montenegro[1]	IMM	—	Servizi Marittimi	—	—	—	—	—
Monterosa[1]	ILW	—	Ferrovie dello Stato	—	—	—	—	—
Monviso ILV[1] ..	ILV	—	Ferrovie dello Stato	—	—	—	—	—
Monviso ITH[1].. ..	ITH	—	Alta Italia	—	—	—	—	—
M. Verderame[1] ..	IVV	—	—	—	—	—	—	—
Napoli	IHO	—	Navy	—	—	—	—	—
Narenta[1]	IVL	—	Libera Triestina	—	—	—	—	—
Natale L.[1]	IPK	—	Lavarello eredi di G. Lavarello ..	—	—	—	—	—
Nembo	IJA	—	Navy	—	—	—	—	—
Nemi[1]	IMW	—	Servizi Marittimi	—	—	—	—	—
Nettuno[1]	ILE	—	Ferrovie dello Stato	—	—	—	—	—
Nicolaos[1]	IYK	—	Soc. Nazionale di Navigaz. ..	—	—	—	—	—
Nicolo 2[1]	IUN	—	N. Odero & Co.	—	—	—	—	—
Nilos[1]	INB	—	Ferrovie dello Stato	—	—	—	—	—
Ninfa[1]	ITV	—	Vincenzo De Luca..	—	—	—	—	—
Nino Bixio	IKF	—	Navy	—	—	—	—	—
Nitor[1]	ION	—	Flli. Lagorara	—	—	—	—	—
Oceano[1]	IPJ	—	Lloyd Mediterraneo	—	—	—	—	—
Oldemburgo[1]	IND	—	Ferrovie dello Stato	—	—	—	—	—
Ombla[1]	IVM	—	Libera Triestina	—	—	—	—	—
Onoria[1]..	IOV	—	General St amship ag.	—	—	—	—	—
Orione 2[1]	INF	190	Marittima Italiana	300, 600	P ..	X	0.40	—
Orseolo[1]	IYC	—	Soc. Ven. di Nav. a Vapore ..	—	—	—	—	—
Ostro	IJB	—	Navy	—	—	—	—	—
Padova[1]	IUT	—	Ferrovie dello Stato	—	—	—	—	—
Palacky[1]	IXA	—	Lloyd Triestino	—	—	—	—	—
Paraguay[1]	IMP	—	Sicilia	—	—	—	—	—
Partenope	IKY	—	Navy	—	—	—	—	—
Patras[1]	IWF	—	Angelo Denegri	—	—	—	—	—
Pegli[1]	IOT	—	Soc. an. Genovese Arm. e Trasp...	—	—	—	—	—
Pesaro[1]..	ILM	—	Ferrovie dello Stato	—	—	—	—	—
Piave IVX[1]	IVX	—	Soc. Prod‹ tti Ch. Colla e Conc. Roma	—	—	—	—	—
Piave IEL[1]	IEL	—	Nav. Generale Italiana (Italia) ..	—	—	—	—	—
Piemonte IKJ	IKJ	—	Navy	—	—	—	—	—
Piemonte INX[1] ..	INX	140	Sicilia	300, 600	P ..	X	0.40	—
Pietro Calvi[1]	IWV	—	Ferrovie dello Stato	—	—	—	—	—
Pilsna[1]	IAE	—	Lloyd Triestino	—	—	—	—	—
Pisa	IHR	—	Navy	—	—	—	—	—
Po[1]	INY	140	Sicilia	300, 600	P ..	X	0.40	—
Pola[1]	INJ	—	Ferrovie dello Stato	—	—	—	—	—
Polynesia[1]	IXQ	—	Stefano Censini	—	—	—	—	—
Pontiere	IJC	—	Navy	—	—	—	—	—
Porto di Alessandretta[1]	INT	190	Marittima Italiana	300, 600	P ..	X	0.40	—
Porto di Savona[1] ..	INV	190	Marittima Italiana	300, 600	P ..	X	0.40	—
Posillipo[1]	IEV	—	Transoceanica	—	—	—	—	—
Praga[1]	IPY	—	Lloyd Triestino	—	—	—	—	—
Presidente Wilson[1] ..	IOB	—	Flli. Cosulich	—	—	—	—	—
Primula[1] (Veliero a Motore)	INO	—	Edoardo Mazza	—	—	—	—	—
Principe di Udine[1] ..	IYU	270	Lloyd Sabaudo	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
ITALY—*contd.*							Francs.	Francs.	
Principessa Jolanda [1]	IOG	—	Soc. Ven. di Nav. a Vapore	—	—	—	—	—	
Principessa Mafalda [1]	IYM	270	Nav. Generale Italiana	300, **600**	P G	N	0.40	—	
Procida [1]	IZD	190	Nav. Generale Italiana	300, **600**	P	X	0.40	—	
Puglia	IKK	—	Navy	—	—	—	—	—	
Quarto	IKD	—	Navy	—	—	—	—	—	
Racconigi [1]	IZJ	—	Lloyd Sabaudo	—	—	—	—	—	
Re d'Italia [1]	IYR	190	Lloyd Sabaudo	300, **600**	P G	N	0.40	—	
Regina d'Italia [1]	INI	—	Lloyd Sabaudo	—	—	—	—	—	
Regina Elena	IHQ	—	Navy	—	—	—	—	—	
Resurrezione [1]	IYY	—	La Polare	—	—	—	—	—	
Re Umberto	IHK	—	Navy	—	—	—	—	—	
Re Vittorio [1]	IZV	270	Nav. Generale Italiana	300, **600**	P G	N	0.40	—	
Rodi [1]	IXN	—	Sicilia	—	—	—	—	—	
Rodosto [1]	IYB	—	Soc. Roma	—	—	—	—	—	
Roma IHP	IHP	—	Navy	—	—	—	—	—	
Roma INR [1]	INR	110	Soc. Marittima Italiana	300, **600**	P G	X	0.40	—	
Roma IYH [1]	IYH	—	Sicilia	—	—	—	—	—	
Rosalia [1]	ITE	—	Lloyd Adriatico	—	—	—	—	—	
Rosario [1]	IXX	—	Soc. Roma	—	—	—	—	—	
Rosalino Orlando [1]	IAL	—	Lloyd Mediterraneo	—	—	—	—	—	
Rossignano [1]	IZM	—	Roma Soc.	—	—	—	—	—	
Rovato [1]	IYJ	—	Soc. Roma	—	—	—	—	—	
Roberbella [1]	IZN	—	Sicilia	—	—	—	—	—	
Rover to [1]	IEG	—	Soc. Roma	—	—	—	—	—	
Rovigno [1]	IOA	—	Soc. Roma	—	—	—	—	—	
Salina [1]	IVR	—	Libora Triestina	—	—	—	—	—	
Salvatore [1]	IWA	—	Angelo Gazzolo	—	—	—	—	—	
S. Gennaro [1]	ITF	—	Transoceanica	—	—	—	—	—	
S. Giorgio IHU	IHU	—	Navy	—	—	—	—	—	
S. Giorgio IMS [1]	IMS	—	Soc. Marittima Italiana	—	—	—	—	—	
S. Giorgio IEA [1]	IEA	190	Transoceanica	300, **600**	P G	N	0.40	—	
S. Giovanni [1]	IEC	190	Transoceanica	300, **600**	P G	N	0.40	—	
S. Giuseppe [1]	IEK	—	Ravano & Carrodo	—	—	—	—	—	
S. Giusto [1]	IPW	—	Ferrovie dello Stato	—	—	—	—	—	
S. Marco	IHT	—	Navy	—	—	—	—	—	
S. Rossore [1]	IME	—	Lloyd Sabaudo	—	—	—	—	—	
Sardegna IHM	IHM	—	Navy	—	—	—	—	—	
Sardegna INS [1]	INS	110	Soc. Servizi Marittimi	300, **600**	P G	X	0.40	—	

Savoia IEH[1]	IEH	190	La Veloce	300, 600	P G ..	N	0.40	—
Savoia 1[1]	IPE	—	Soc. Naz. di Navigazione.. ..	—	—	—	—	—
Savoia 2[1]	IZH	—	Soc. Naz. di Navigazione.. ..	—	—	—	—	—
Scampolo[1]	IVW	—	Lloyd Sabaudo	—	—	—	—	—
Scillin[1]	IVC	—	Flli. Bianchi	—	—	—	—	—
Scrivia[1]	IMU	—	Marittima Italiana	—	—	—	—	—
Sebastiano Caboto ..	IGZ	—	Navy	—	—	—	—	—
Sestri[1]	IZK	—	Soc. Esercizio Bacini	—	—	—	—	—
Sicania[1]	IEZ	—	Transoceanica	—	—	—	—	—
Sicilia IHL	IHL	—	Navy	—	—	—	—	—
Sicilia INL[1]	INL	110	Soc. It. Serv. Marittimi	300, 600	P G ..	X	0.40	—
Silvio Pellico[1]	IMI	—	Ferrovie dello Stato	—	—	—	—	—
Sirte[1]	IZY	—	The General Steamship Ag. ..	—	—	—	—	—
Sofia Hohemberg[1] ..	IPR	—	Flli. Cosulich	—	—	—	—	—
Solunto[1]	IEU	140	Sicilia	300, 600	P ..	X	0.40	—
Sori[1]	ITN	—	Alta Italia	—	—	—	—	—
Sowwell[1]	IXC	—	Corrado Andrea	—	—	—	—	—
Speranza[1]	IWO	—	Becchi & Calcagno	—	—	—	—	—
Splendor[1]	ILS	190	Columbia	300, 600	P ..	X	0.40	—
Sri Samud[1]	IPN	—	Ferrovie dello Stato	—	—	—	—	—
Sterope	IGK	—	Navy	—	—	—	—	—
Strale	IJD	—	Navy	—	—	—	—	—
Stromboli[1]	IWH	—	Nav. Generale Italiana	—	—	—	—	—
Sumatra[1]	IPB	—	Soc. Marittima Italiana	—	—	—	—	—
Taormina[1]	IYT	270	Nav. Generale Italiana	300, 600	P G ..	N	0.40	—
Tatra ILR[2]	ILR	190	Ferrovie dello Stato	300, 600	P ..	X	0.40	—
Tebe[1]	IYD	—	Sicilia	—	—	—	—	—
Teresa Accame[1] ..	IPP	—	Flli. Accame di Luigi	—	—	—	—	—
Teresa O[1]	ITA	—	Oderon fu Alessandro	—	—	—	—	—
Theodo[1]	INU	—	Ferrovie dello Stato	—	—	—	—	—
Tirol[1]	—	—	Lloyd Triestino	—	—	—	—	—
Tirreno[1]	IMT	—	Marittima Italiana	—	—	—	—	—
Titania[1]	IVD	—	Ilva-Lloyd Mediterraneo	—	—	—	—	—
Tobruk	IKA	—	Navy	—	—	—	—	—
Tocra[1]	IYF	—	Sicilia	—	—	—	—	—
Tolemaide[1]	IMX	—	Sicilia	—	—	—	—	—
Tommaso di Savoia[1] ..	IYS	190	Lloyd Sabaudo	300, 600	P G ..	N	0.40	—
Tortona[1]	IUS	—	Ferrovie dello Stato	—	—	—	—	—
Trasimeno[1]	IMR	—	Serv. Marittimi	—	—	—	—	—
Trinacria[1]	IGC	—	Government	—	—	—	—	—
Tripoli	IKV	—	Navy	—	—	—	—	—
Umbria[1]	ITU	190	Soc. It. Serv. Marittimi	300, 600	P G ..	X	0.40	—
Ugo Bassi[1]	IUW	—	Ferrovie dello Stato	—	—	—	—	—
Valdarno[1]	IUE	—	Ilva-Lloyd Mediterraneo	—	—	—	—	—
Vallarsa[1]	IUO	—	Lloyd Mediterraneo	—	—	—	—	—
Varese	IHY	—	Navy	—	—	—	—	—
Vega[1]	IMZ	—	Flli. Lavarello & Censini	—	—	—	—	—
Veniero[1]	IYA	—	S. Ven. di. Nav. a Vaporo ..	—	—	—	—	—
Vesuvio[1]	IZQ	190	Nav. Gen. Italiana	300, 600	P ..	X	0.40	—
Vindobona[1]	—	—	Lloyd Triestino	—	—	—	—	—
Virginia[1]	IWT	—	Lloyd Mediterraneo	—	—	—	—	—
Vittoria[1]	—	—	Soc. Lucania	—	—	—	—	—
Vittorio[1]	IWY	—	Vittoria	—	—	—	—	—
Vittorio Emanuele ..	IHN	—	Navy	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
ITALY—*contd.*									
Vittorio Veneto[1]	IUC	—	La Veloce	—	—	—	—	—	
Volturno[1]	IEQ	—	Transoceanica	—	—	—	—	—	
Vulcano IGL	IGL	—	Navy	—	—	—	—	—	
Vulcano IZO[1]	IZO	190	Nav. Generale Italiana	300, **600**	P ..	X	0.40	—	
Wardka[1]	ILQ	—	Corrado Andrea	—	—	—	—	—	
Zeffiro	IJE	—	Navy	—	—	—	—	—	
Zovetto[1]	IWK	—	A. Parodi	—	—	—	—	—	
JAPAN									
Adzuma	JRD	—	Navy	—	O ..	—	—	—	[1] Operated by the Ministry of Communication
Africa Maru[2]	JDF	Day 400	Osaka Shosen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	[2] Operated and controlled by the owners
Aikoku Maru[2] ..	JDT	Day 400	Uchida Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Akashi	JLM	—	Navy —	—	O ..	—	—	—	
Aki	JGK	—	Navy	—	O ..	—	—	—	
Aki Maru[1]	JAI	Day 500 Night 1,500	Nippon Yusen Kaisha	300, **600**	P G ..	N	0.40	—	
Akita Maru[2]	JCB	Day 400	Nippon Yusen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Akitsushima	JUQ	—	Navy	—	O ..	—	—	—	
Alaska Maru[2]	JAL	Day 400	Chr. Christensen, Sandefjord ..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Alps Maru[2]	JBP	Day 300	Osaka Shosen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Altai Maru[2]	JFE	Day 300	Osaka Shosen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Amagisan Maru[2] ..	JYG	Day 400	Ryoto Kisen Kaisha	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Amazon Maru[3]	JAZ	Day 300	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
America Maru[1] ..	JAC	Day 400 Night 1,000	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Amur Maru[3]	JAR	Day 300	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Andes Maru[3]	JFU	Day 300	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Annan Maru[3]	JDN	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Anyo Maru[1]	JAY	Day 4 o	Toyo Kisen Kaisha	300, 600	P G ..	N	0.40	—
Arabia Maru[3]	JEG	Day 400	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Asahi	JGB	—	Navy	—	O ..	—	—	—
Asama	JRA	—	Navy	—	O ..	—	—	—
Aso	JRL	—	Navy	—	O ..	—	—	—
Atagosan Maru[3] ..	JYA	Day 400	Ryoto Kisen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Ataka Maru[3]	JBD	Day 400	Goshi Kaisha Tatsuuma Shokai ..	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Atsuta Maru[1]	JAT	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Awa Maru[1]	JAW	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Ayaha[3]	JYV	Day 400	Tatsuuma Kisen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Azuma Maru[3]	JBM	Day 400	Tokyo Salvage Co.	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Azumasan Maru[3] ..	JBS	Day 400	Ryoto Kisen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Batavia Maru[1] ..	JIC	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Bingo Maru[1]	JBG	Day 300 Night 1,000	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40	—
Bombay Maru[3] ..	JHU	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Borneo Maru JCL[3] ..	JCL	Day 500	Osaka Shosen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Borneo Maru JPB[2]	JPB	Day 400	Nanyo Yusen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Boston Maru[2]	JMC	Day 200	Kokusai Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Burma Maru[2]	JYY	Day 200	Osaka Shosen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Buyo Maru[2]	JPX	Day 200	Asano Zosenjo	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Canada Maru[1]	JCD	Day 350 Night 1,200	Osaka Shosen Kaisha	300, **600**	P G	N	0.40	—	
Capetown Maru[2]	JBE	Day 400	Kawasaki Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Celebes Maru[2]	JCE	Day 500	Kawasaki Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Ceylon Maru[2]	JDW	Day 400	Nippon Yusen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Chefoo Maru[2]	JKC	Day 200	Nippon Yusen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Chicago Maru[1]	JCC	Day 350 Night 1,200	Osaka Shosen Kaisha	300, **600**	P G	N	0.40	—	
Chifuku Maru[2]	JHZ	Day 500	Kawasaki Zosenjo	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Chihaya	JWB	—	Navy	—	O	—	—	—	
Chikuma	JLG	—	Navy	—	O	—	—	—	
Chitose	JLB	—	Navy	—	O	—	—	—	
Chiyoda	JUP	—	Navy	—	O	—	—	—	
Chosen Maru[2]	JPV	Day 200	Osaka Shosen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Choyo Maru[2]	JOY	Day 400	Toyo Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Daibu Maru [3]	JEU	Day 400	Kokusai Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Delagoa Maru [3] ..	JDI	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Eifuku Maru [3] ..	JFG	Day 400	Kawasaki Dockyard Co.	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Fuji	JUC	—	Navy	—	O ..	—	—	—
Fukui Maru [3]	JYT	Day 200	Uchida Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Fukuyo Maru [3]	JKV	Day 400	Nippon Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Fushimi	JWJ	—	Navy	—	O ..	—	—	—
Fushimi Maru [1] ..	JFM	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Fuso	JGN	—	Navy	—	—	—	—	—
Ganges Maru [3] ..	JEP	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Genchu Maru [3] ..	JHD	Day 400	Uyenishi Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Genmei Maru [3] ..	JBN	Day 400	Uyenishi Shokai	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Genoa Maru [3]	JSL	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Genyei Maru [3]	JIN	Day 200	Uyenishi Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Hakata Maru [3] ..	JPK	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Hakodate Maru [3] ..	JMB	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Hakushika Maru [3] ..	JBX	Day 400	Tatsuuma Kisen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Hanasaki Maru [3] ..	JCF	Day 200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Harbin Maru [1] ..	JHB	Day 450 Night 1,200	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Haruna	JGX	—	Navy	—	—	—	—	—
Haruna Maru [3]	JPH	Day 200	Tokio Salvage Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radiotelegram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Hashidate	JUO	—	Navy	—	O	—	—	—	
Hawaii Maru [1]	JHW	Day 450 Night 1,300	Osaka Shosen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Hayatori Maru [1]	JHY	100	Ministry of Agriculture & Commerce	300, **600**	P G	N	0.40	—	
Heijin Maru [2]	JIV	Day 400	Taiyo Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Heimei Maru [2]	JKP	Day 400	Taiyo Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Heinan Maru [2]	JEB	Day 400	Taiyo Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Hiei	JGV	—	Navy	—	O	—	—	—	
Himalaya Maru [2]	JFN	Day 400	Osaka Shosen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Hirano Maru [1]	JHR	Day 4 0 Night 1,200	Nippon Yusen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Hirato	JLJ	—	Navy	—	O	—	—	—	
Hiuga	JGY	—	Navy	—	O	—	—	—	
Hizen	JGD	—	Navy	—	O	—	—	—	
Hoeisan Maru [2]	JFQ	Day 400	Mitsui Bussan Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Hokkai Maru [2]	JYP	Day 400	Taisho Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Hong Kong Maru [1]	JHN	Day 300 Night 1,0 0	Osaka Shosen Kaisha	300, **600**	P G	N	0.40	—	
Horaisan Maru [2]	JBJ	Day 400	Mutsui Bussan Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Hozan Maru [2]	JYZ	Day 400	Osaka Shosen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Hwag Ping [2]	JDL	Day 200	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Ibuki	JGT	—	Navy	—	O ..	—	—	—
Idzumo	JRG	—	Navy	—	O ..	—	—	—
Iki Maru [1]	JIL	Day 350 Night 1,000	Imperial Government Railways	300, 600, 1,800	P G ..	N	0.40	—
Ikoma	JGQ	—	Navy	—	O ..	—	—	—
Ikomasan Maru [2] ..	JBV	Day 400	Mitsui Bussan Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Inaba Maru [1]	JIB	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Inaho Maru [2]	JFB	Day 400	Itaya Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Indo Maru [2]	JDS	Day 400	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Indus Maru [2]	JCR	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Ise	JGP	—	Navy	—	O ..	—	—	—
Italy Maru [2]	JAH	Day 400	Kawasaki Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Itsukushima	JUN	—	Navy	—	O ..	—	—	—
Iwami	JUD	—	Navy	—	O ..	—	—	—
Iwate	JRF	—	Navy	—	O ..	—	—	—
Iyo Maru [1]	JPO	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Java Maru [2]	JDU	Day 400	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 p.m. to 5 8 to 12 p.m.	0.40	—
Jinsen Maru [2]	JDZ	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Jinsho Maru [2]	JIQ	Day 400	Taiyo Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kaga Maru [2]	JPG	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Kagi Maru [1]	JKG	Day 300 Night 1,000	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Kaian Maru [2]	JIP	Day 400	Katsuta Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kaiei Maru [2]	JFF	Day 400	Katsuta Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kaifuku Maru [2] ..	JBF	Day 400	Katsuta Ginjiro	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Mini-mum per Radio-tele-gram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Kaikyu Maru[2]	JKK	Day 400	Katsuta Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kaisho Maru[2]	JEO	Day 400	Katsuda Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kamakura Maru[2]	JPR	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kamiji Maru[2]	JKJ	Day 200	Teikoku Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kamo Maru[1]	JKA	Day 450 Night 1,200	Nippon Yusen Kaisha	300, **600**	P G	N	0.40	—	
Kanagawa Maru[2]	JNA	400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Karachi Maru[2]	JKH	Day 50	Kawasaki Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Karasaki	JUV	—	Navy	—	O	—	—	—	
Kasado Maru[1]	JKT	Day 300 Night 1,000	Osaka Shosen Kaisha	300, **600**	P G	N	0.40	—	
Kashima	JGG	—	Navy	—	O	—	—	—	
Kashima Maru[1]	JKX	Day 450 Night 1,200	Nippon Yusen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Kasuga	JRJ	—	Navy	—	O	—	—	—	
Kasuga Maru[1]	JES	Day 200	Nippon Yusen Kaisha	300, **600**	P G	N	0.40	—	
Katori	JGF	—	Navy	—	O	—	—	—	
Katori Maru[1]	JKR	Day 450 Night 1,200	Nippon Yusen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Kawachi Maru[2]	JPC	Day 200	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Kayo Maru [1]	JKO	Day 250 Night 800	Oaki Goshi Kaisha	300, **600**	P G ..	N	0.40	—
Keifuku Maru [2] ..	JHT	Day 400	Kawasaki Zooenjo	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Keishin Maru [2]	JCK	Day 400	Goshi Kaisha Tatsuuma Shokai ..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kibi Maru No. 6 [2] ..	JHP	Day 400	Toyosaki Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kifuku Maru [2]	JHK	Day 400	Kawasaki Dockyard Co. ..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kimi Maru [2]	JHS	Day 400	Toyosaki Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kinkasan Maru [2] ..	JYK	Day 400	Mitsui Bussan Kaisha	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kirin Maru [2]	JDX	Day 200	Nippon Yusen Kaisha	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kirishima	JGW	—	Navy	—	—	—	—	—
Kishun Maru [2] ..	JFH	Day 200	Tatsuma Kisen Kabushiki Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kitano Maru [1]	JKN	Day 450 Night 1,200	Nippon Yusen Kaisha	300, **600**, 1,800	P G ..	N	0.40	—
Kiyo Maru [1]	JKY	Day 250 Night 800	Toyo Kisen Kaisha	300, **600**	P G ..	N	0.40	—
Koan Maru [2]	JFO	Day 400	Katsuda Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kobe Maru [1]	JKB	Day 300 Night 1,000	Nippon Yusen Kaisha	300, **600**	P G ..	N	0.40	—
Koei Maru [2]	JEK	Day 400	Hiromi Shoji Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kofuku Maru JBQ [2] ..	JBQ	Day 400	Hiromi Shoji Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Kofuku Maru JFL [2] ..	JFL	Day 500	Kawasaki Dockyard Co. ..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Komagata Maru [2] ..	JDV	Day 300	Yamashita Kamesaburo	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Komahashi	JUU	—	Navy	—	O ..	—	—	—

Ship Stations—*Continued*

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JAPAN—*contd.*							Francs.	Francs.	
Koma Maru[1]	JKL	Day 400 Night 1,200	Imperial Government Railways	300, **600**, 1,800	P G	N	0.40	—	
Konan Maru[2]	JHA	Day 400	Kobe Sambashi Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kongo	JGU	—	Navy	—	O	—	—	—	
Kongosan Maru[2]	JYQ	Day 400	Ryoto Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Korea Maru[2]	JYL	Day 500	Toyo Kisen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Kosai Maru[2]	JKS	Day 120 Night 200	Chosen Government	—	—	N	—	—	
Kotsu Maru[2]	JIG	Day 400	Hiromi Shoji Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Koyo Maru[2]	JKD	Day 400	Toyo Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kuma	JLA	—	Navy	—	O	—	—	—	
Kumano Maru[2]	JKF	Day 200	Nippon Yusen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kunajiri Maru[2]	JKU	Day 400	Nihon Kaiin Ekisai Kai	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Kurama	JGR	—	Navy	—	O	—	—	—	
Kureha Maru[2]	JBH	Day 400	Tatsuuma Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Liverpool Maru[2]	JPL	Day 500	Kawasaki Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Luzon Maru[2]	JDQ	Day 200	Osaka Shosen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Madras Maru[3]	JIR	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Malay Maru[3]	JEM	Day 400	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40		
Mandasan Maru[3] ..	JYJ	Day 400	Mitsui Bussan Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Manila Maru[1] ..	JMR	Day 450 Night 1,300	Osaka Shosen Kaisha	300, 600, 1,800	P G ..	N	0.40	—	
Manshu	JUT	—	Navy	—	O ..	—	—	—	
Mayachi Maru[3] ..	JEL	Day 200	Hokkaido Tanko Kisen Kaisha ..	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40		
Meichi Maru[3]	JBA	Day 200	Meiji Kaiun Kaisha	300, 600	P ..	8 to 11 a.m 2 to 5 p.m. 8 to 12 p.m.	0.40		
Meichu Maru[3] ..	JFR	Day 400	Taisho Kaium Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Meidai Maru[3]	JFD	Day 300	Yamaji Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Meikai Maru[3]	JCA	Day 200	Meiji Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Meiko Maru[3]	JDO	Day 400	Meiji Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Meiten Maru[3] ..	JDG	Day 400	Taisho Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Meiu Maru[3]	JFV	Day 400	Taisho Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Mexico Maru[1]	JMX	Day 350 Night 1,200	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40		
Miikesan Maru[3] ..	JBI	Day 200	Mitsui Bussan Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Mikasa	JGC	—	Navy	—	O ..	—	—		
Mishima	JUL	—	Navy	—	O ..	—	—		
Mishima Maru[1] ..	JMQ	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40		
Mogami..	JWD	—	Navy	—	O ..	—	—		
Musashi..	JUY	—	Navy	—	O ..	—	—		
Nagano Maru[3].. ..	JCI	Day 200	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40		

Ship Stations—*Continued*

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JAPAN—*contd.*							Francs.	Francs.	
Nagato Maru [2] ..	JEY	Day 400	Nippon Yusen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Nankai Maru [2] ..	JYF	Day 400	Meiji Kaiun Kaisha	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Nanking Maru [2] ..	JCG	Day 200	Osaka Shosen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Niitaka	JLN	—	Navy	—	O ..	—	—	—	
Nikko Maru [1]	JNL	Day 450 Night 1,200	Nippon Yusen Kaisha	300, **600**, 1,800	P G ..	N	0.40	—	
Nippon Maru [1] ..	JNP	Day 300 Night 1,000	Toyo Kisen Kaisha	300, **600**	P G ..	N	0.40	—	
Nisshin	JRK	—	Navy	—	O ..	—	—	—	
Ogasawarra Maru [2] ..	JOG	Day 300 Night 800	Ministry of Communications ..	300, **600**	—	—	—	—	
Okinawa Maru [2] ..	JON	Day 350 Night 1,000	Ministry of Communications ..	300, **600**	—	—	—	—	
Okinoshima	JUK	—	Navy	—	O ..	—	—	—	
Oridono Maru [2] ..	JCO	Day 400	Tatsuuma Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40		
Otaru Maru No. 2 [2] ..	JEH	Day 400	Yamashita Kisen Kaisha..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Otori Maru [2]	JOT	Day 300	Ro yo Su san Kumiai	300, **600**	P G ..	X	0.40	—	
Oura Maru [2]	JYC	Day 300	Nippon Kaiji Kogyo Kaisha ..	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Panama Maru [1] ..	JPM	Day 350 Night 1,200	Osaka Shosen Kaisha	300, **600**	P G ..	N	0.40	—	

Peking Maru [2]	JFP	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Penang Maru [2] ..	JDR	Day 200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 o 12 p.m.	0.40	—
Persia Maru [2]	JPP	Day 400	Toyo Kisen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Portsaid Maru [2] ..	JPN	Day 500	Kawasaki Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Raifuku Maru [2] ..	JHL	Day 400	Kawasaki Zosenjo	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Rangoon Maru [2] ..	JDY	Day 200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Rashu Maru [1]	JER	Day 400	Imperial Government Railways ..	300, 600	P G ..	N	0.40	—
Riojun Maru [2] ..	JYR	Day 400	Nanyo Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Rozan Maru [2]	JOZ	Day 200	Hashimoto Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Sado Maru [1]	JSD	Day 300 Night 1,000	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40	—
Saga JWL	JWL	—	Navy	—	O ..	—	—	—
Saigon Maru [2]	JEV	Day 200	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Saikai Maru [2]	JEZ	Day 400	Katsuda Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Sakaki Maru [1]	JKI	Day 400 Night 1,200	Teikoku Kaiji Kyokwai	300, 600	P G ..	N	0.40	—
Sakigake Maru No. 3 [2]	JBK	Day 100	Nippon Kaijo Kogyo Kaisha ..	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Sanuki Maru [2]	JPS	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Satsuma JGJ	JGJ	—	Navy	—	O ..	—	—	—
Seattle Maru [1]	JST	Day 350 Night 1,200	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Seiyo Maru [1]	JSY	Day 400	Toyo Kisen Kaisha	300, 600	P G ..	N	0.40	—
Settsu	JGM	—	Navy	—	O ..	—	—	—
Shidzuoka Maru [1] ..	JSZ	Day 350 night 1,200	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40	—
Shikishima	JGA	—	Navy	—	O ..	—	—	—
Shinano Maru [1] ..	JSN	Day 350 Night 1,200	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Shinbu Maru [2]	JBB	Day 400	Katsuda Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Shinkoku Maru [2]	JCV	Day 500	Kishimoto Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Shinpo Maru [2]	JDH	Day 400	Kishimoto Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Shinsei Maru [2]	JEF	Day 200	Kishimoto Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Shinyo Maru JSH [1]	JSH	Day 450 Night 1,500	Toyo Kisen Kaisha	300, **600**	P G	N	0.40	—	
Shinyo Maru JPY [2]	JPY	Day 200	Toyo Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Shiragi Maru [1]	JSK	Day 350 Night 1,000	Imperial Government Railways	300, **600**, 1,800	P G	N	0.40	—	
Siam Maru [2]	JYX	Day 200	Osaka Shosen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Siberia Maru [2]	JBR	Day 500 Night 1,500	Toyo Kisen Kaisha	300, **600**, 1,800	P G	N	0.40	—	
Singapore Maru [2]	JSP	Day 500	Kawasaki Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Somedono Maru [2]	JYN	Day 400	Tatsuuma Kisen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Suki Maru [2]	JDP	Day 300	Tatsuuma Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Suma	JLL	—	Navy	—	O	—	—	—	
Sumatra Maru [2]	JCU	Day 500	Osaka Shosen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Sumida	JWG	—	Navy		O ..	—	—	—
Suwa Maru [1]	JSU	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Suwo	JUG	—	Navy	—	O ..	—	—	—
Tacoma Maru [1] ..	JTA	Day 350 Night 1,200	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Taichu Maru [1]	JTC	Day 300 Night 1,000	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Taiho Maru [2]	JHV	Day 400	Uchida Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Taikai Maru [2]	JEE	Day 400	Taiwan Seito Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Tainan Maru [1]	JTN	Day 300 Night 1,000	Osaka Shosen Kaisha	300, 600	P G ..	N	0.40	—
Taisan Maru [2]	JFW	Day 400	Hashimoto Kisen Kaisha.. ..	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Taisei Maru [1]	JTM	Day 300 Night 1,000	Imperial Government Railways ..	300, 600	P G ..	N	0.40	
Taito Maru [2]	JFT	Day 400	Uchida Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Taiyu Maru [2]	JCW	Day 400	Uchida Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	
Tajima Maru [2] ..	JPJ	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Tama Maru [2]	JFI	Day 400	Tokio Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Tamatsu Maru [2] ..	JTP	Day 400	Yamashita Kisen Kaisha ..	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Tamba Maru [1]	JTB	Day 300 Night 1,000	Nippon Yusen Kaisha	300, 600	P G ..	N	0.40	—
Tango Maru [1]	JTG	Day 450 Night 1,200	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	N	0.40	—
Tatsuno Maru [2] ..	JPU	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—
Tencho Maru [2] ..	JHG	Day 150	Tatsuma Kisen Kabushiki Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word	Ship Charge. Minimum per Radio-telegram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Tenkai Maru [2]	JCN	Day 400	S. Koyanagi	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tenpaisan Maru [2]	JPZ	Day 400	Mitsui Bussan Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tenryu	JLP	—	Navy	—	O	—	—	—	
Tensho Maru [2]	JCH	Day 400	K. Koguma	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Teny , Maru [1]	JTY	Day 450 Night 1,500	Toyo Kisen Kaisha	300, **600**	P G	N	0.40	—	
Toba	JWK	—	Navy	—	O	—	—	—	
Toba Maru [2]	JPF	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tokai Maru [2]	JDK	Day 400	Nansho Yoko	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m 8 to 12 p.m.	0.40	—	
Tokiwa	JRB	—	Navy	—	O	—	—	—	
Tokiwa Maru [2]	JYW	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tokushima Maru [2]	JTQ	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tokuyama Maru	JTU	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tone	JLF	—	Navy	—	O	—	—	—	
Tosa Maru [2]	JBT	Day 400	Nippon Yusen Kaisha	300, **600**, 1,800	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tosan Maru [2]	JFZ	Day 400	Katsuta Kisen Kaisha	300, **600**	P G	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Tottori Maru [3] ..	JPQ	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Toyama Maru [3] ..	JTX	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Toyohashi Maru [3] ..	JPT	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Toyooka Maru [3] ..	JYO	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tsugaru	JLC	—	Navy	—	O ..	—	—	—	
Tsuruga Maru [3] ..	JPA	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tsurugisan Maru [3] ..	JBL	Day 400	Mitsui Bussan Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tsurushima Maru [3] ..	JTV	Day 400	Uwajima Unyu Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tsushima	JLO	—	Navy	—	O ..	—	—	—	
Tsushima Maru JMA [3]	JMA	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Tsushima Maru JTL [3] ..	JTL	Day 350 Night 1,000	Imperial Government Railways ..	300, 600, 1,800	P G ..	N	0.40	—	
Tsuyama Maru [3] ..	JYM	Day 400	Nippon Yusen Kaisha	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Uji	JWF	—	Navy	—	O ..	—	—	—	
Ume Maru [3]	JEW	Day 400	Taiyo Kaiun Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Wakamiya	JUR	—	Navy	—	—	—	—	—	
Wakasa Maru [3] ..	JPW	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yahagi	JLK	—	Navy	—	O ..	—	—	—	
Yakumo	JRC	—	Navy	—	O ..	—	—	—	
Yakumo Maru [3] ..	JYS	Day 400	Osaka Shosen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yamagata Maru [3] ..	JCP	Day 400	Nippon Yusen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yamashiro	JGO	—	Navy	—	O ..	—	—	—	
Yamato	JUX	—	Navy	—	O ..	—	—	—	
Yaye Maru [3]	JAE	Day 400	Kokusai Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
JAPAN—*contd.*							Francs.	Francs.	
Yayoi Maru [2] [1]	JYI	Day 400	Kokusai Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yeboshi Maru [2] ..	JHO	Day 400	Nippon Yusen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Ye.tai Maru [2]	JCT	Day 400	Katsuda Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yerimo Maru [2] ..	JEA	Day 200	Osaka Shosen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yetorofu Maru [2] ..	JFA	Day 200	Nippon Yusen Kaisha	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yodo	JWC	—	Navy	—	O ..	—	—	—	
Yoko Maru [2]	JAB	Day 400	Taiyo Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yokohama Maru [1] ..	JYH	Day 350 Night 1,200	Nippon Yusen Kaisha	300, **600**	P G ..	N	0.40	—	
Yomei Maru [2]	JIX	Day 400	Taiyo Kisen Kiasha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yonan Maru [2]	JNC	Day 400	Taiyo Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yone Maru [2]	JIW	Day 400	Kokusai Kisen Kaisha	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yoshida Maru No. 1 [2] ..	JIH	Day 200	Yamashita Kisen Kaisha.. ..	300, **600**	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yoshida Maru No. 2 [2] ..	JBY	Day 400	Yamashita Kisen Kaisha.. ..	300, **600**, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	

Yoshida Maru No. 3[2] ..	JCY	Day 400	Yamashita Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yubae Maru[2]	JYE	Day 400	Kokusai Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yubari Maru	JBU	Day 400	K. Shida (Mitsui Bussan Kaisha)	300, 600, 1,800	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yuki[2] Maru	JDC	Day 300	Tatsuuma Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
Yuri Maru[2]	JAF	Day 400	Teikoku Kisen Kaisha	300, 600	P G ..	8 to 11 a.m. 2 to 5 p.m. 8 to 12 p.m.	0.40	—	
MEXICO									
Coahuila[2]	XBL	—	Comp. de Fomento del Sur. de Mexico	—	P G ..	—	0.40	—	[1] Operated and controlled by the Marconi International Com. Co., Ltd., London [2] Operated and controlled by the Marconi Wireless Tel. Co. of America on behalf of the Marconi International Com. Co. Ltd. London
General Zaragoza ..	XCA	—	Navy	600	O ..	2 to 6 a.m. 6 to 10 p.m.	—	—	
Jalisco[2]	XBK	—	Comp. de Fomento del Sur. de Mexico	—	P G ..	—	0.40	—	
Mexico XBB	XBB	120	Comp. de Fomento del Sur. de Mexico	300, 600	P G ..	X	0.40	—	
Progreso	XCF	400	Government	600	P G ..	N	0.40	4.00	
San Antonio[1]	XBE	130	Cia. Mexicana de Vap. "San Antonio" S.A.	300, 600	P G ..	X	0.40	—	
San Bernardo[1] ..	XBA	170	Cia. Mexicana de Petroleo "El Aguila," S.A.	300, 600	P G ..	X	0.40	—	
San Cristobal[1] ..	XBI	—	Cia. Mexicana de Petroleo "El Aguila," S.A.	—	P G ..	—	0.40	—	
MONACO									
Hirondelle	CQA	380	Prince of Monaco	600	P ..	X	—	—	
MOROCCO									
Fadi	CNJ	120	Customs Administration ..	300	O ..	N	—	—	
Marrakchi	CNM	120	Customs Administration ..	300	O ..	N	—	—	
Meknassi	CNK	120	Customs Administration ..	300	O ..	N	—	—	
Taraudant	CNT	120	Customs Administration ..	300	O ..	N	—	—	
NATAL									
Assouan	—	—	Assouan S.S. Co., Ltd.	—	—	—	—	—	
NETHERLANDS (See **HOLLAND**)									

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
NEW ZEALAND							Francs.	Francs.	
Arahura[1]	VMA	Day 150 Night 400	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.20	—	[1] Operated and controlled by Amalgamated Wireless (Australasia) Ltd.
Atua[1]	VLU	325	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Flora[1]	VZF	—	Union S.S. Co. of N.Z., Ltd.	—	—	—	—	—	
Kaiapoi[1]	VLH	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Kaitangata[1]	VLI	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Kaituna[1]	VLT	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Kaiwarro[1]	—	—	Union S.S. Co. of N.Z., Ltd.	—	—	—	—	—	
Karori[1]	VMB	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Katoa[1]	VMN	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Kauri[1]	VMC	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Koromiko[1]	VMD	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Kurow[1]	VLP	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Maheno[1]	VLE	325	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Makura[1]	VLK	250	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Manuka[1]	VLN	325	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Maori[1]	VLZ	Day 250 Night 500	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Marama[1]	VLR	250	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Mararoa[1]	VMZ	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Maunganui[1]	VLG	250	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Moana[1]	VLO	325	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Moeraki[1]	VLM	—	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	—	—	
Mokoia[1]	VMK	Day 250 Night 500	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Monowai[1]	VMM	Day 250 Night 500	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.20	—	
Navua[1]	VLV	250	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	
Niagara[1]	GBE	—	Union S.S. Co. of N.Z., Ltd.	—	—	—	—	—	
Oonah[1]	VXA	—	Union S.S. Co. of N.Z., Ltd.	—	—	—	—	—	
Paloona[1]	VLY	Day 250 Night 500	Union S.S. Co. of N.Z., Ltd.	300, **600**	P G	X	0.40	—	

Pateena [1]	VZD	—	Union S.S. Co. of N.Z., Ltd. ..	—	—	—	—	—
Rakanoa [1]	VME	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Rotomahana [1]	VMX	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Tahiti [1]	MYN	—	Union S.S. Co. of N.Z., Ltd. ..	—	—	—	—	—
Talune [1]	VLL	250	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	0.40	—
Tarawera [1]	VMF	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Tofua [1]	VLF	250	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	0.40	—
Tutanekai [1]	VLX	325	Government	300, **600**	O ..	X	—	—
Wahine [1]	VLJ	Day 250 Night 500	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	0.40	—
Waihora [1]	VMW	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Waimarino [1]	YUS	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Waipori [1]	VMO	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Wairuna [1]	—	—	Union S.S. Co. of N.Z., Ltd. ..	—	—	—	—	—
Waitemata [1]	—	—	Union S.S. Co. of N.Z., Ltd. ..	—	—	—	—	—
Waitomo [1]	VMJ	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Wanaka [1]	VMP	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
Whangape [1]	VML	—	Union S.S. Co. of N.Z., Ltd. ..	300, **600**	P G ..	X	—	—
NORWAY								
Admiralen [3]	LDU	110-150	Johan Bryde	300, **600**	P G ..	X	0.40	4.00
Arly [2]	LFZ	150-200	R. Ouergaard & Co.	300, **600**	P G ..	X	0.40	4.00
Artemis LFW [2] ..	LFW	150-200	Norway Mexico Gulf Line ..	300, **600**	P G ..	X	0.40	4.00
Asp [1]	LGV	—	A/S, Vesterhav, K.M. Pedersen, Kristiansand	—	—	—	—	—
Atle Jarl [2]	LEY	100-150	Det Nordenfjeldske Dampskibsselskab	300, **600**	P G ..	X	0.20	2.00
Atna [2]	LFC	150-250	Den Norske Afrika- og Aust. ..	300, **600**	P G ..	X	0.40	4.00
Baja California [2] ..	LHC	300	A. O. Lindvig	300, **600**	P G ..	X	0.40	4.00
Balto [2]	LHI	100-150	B. Stolt Nielsen	300, **600**	P G ..	X	0.20	2.00
Bayard [2]	LER	150-200	Akties. Bonheur (F. Olsen) ..	300, **600**	P G ..	X	0.40	4.00
Belridge [2]	LEF	100-150	Akties. Tankfart	300, **600**	P G ..	X	0.40	4.00
Bergensfjord [1] ..	LFB	200	Den Norske Amerikalinje, Kr. ..	300, 450, **600**	P G ..	N	0.40	4.00
Bessa [2]	LGT	200-250	Den Norske Afrika- og, Austr. ..	300, **600**	P G ..	X	0.40	4.00
Bessheim [2]	LDA	160	A/S Ganger Rolf (F. Olsen) ..	300, 450, **600**	P G ..	N	0.28	2.80
Bjonongen [2]	LHK	250	Olav Haabeth	300, 450, **600**	P G ..	X	0.40	4.00
Bonna [2]	LFX	150-200	Den Norske Afrika- og Austral. ..	300, **600**	P G ..	X	0.40	4.00
Borgestad [2]	LDZ	150	A/S Borgestad (G. Knudsen) ..	300, **600**	P G ..	X	0.40	4.00
Borgland [2]	LGW	150-200	Fred Olsen & Co.	300, **600**	P G ..	X	0.40	4.00
Braganza [2]	LDD	300	Capt. Ingv. Svendsen	300, 450, **600**	P G ..	X	0.40	4.00
Brazil LEQ [2]	LEQ	150-200	A/S Ganger Rolf (F. Olsen) ..	300, **600**	P G ..	X	0.40	4.00
Bravore [1]	—	—	Lundegaard & Stray, Farsund ..	—	—	—	—	—
Breifond [2]	LGX	200-250	Sigval Bergesen	300, **600**	P G ..	X	0.40	4.00
Capto [1]	LGL	100-150	B. Stolt Nielsen, Haugesund ..	300, **600**	P G ..	X	0.40	4.00
Cometa [2]	LDS	125	Det Bergenske Dampskibsselskab	300, **600**	P G ..	X	0.20	2.00
Delfinus [2]	LHM	—	Det Bergenske Dampskibsselskab	300, **600**	P G ..	X	0.20	2.00
Dicto [1]	LGZ	100-150	B. Stolt Nielsen, Haugesund ..	300, **600**	P G ..	X	0.40	4.00
Drammensfjord [2] ..	LFL	100-150	Den Norske Amerika-Linje ..	300, **600**	P G ..	X	0.40	4.00
Ellis [2]	LDX	350	O. & A. Irgens	300, **600**	P G ..	X	0.40	4.00
Folkvard [2]	LGA	200-250	Government	300, **600**	P G ..	X	0.40	4.00
George Washington [2] ..	LFQ	150-200	A/S "Borga" (P. Olsen).. ..	300, **600**	P G ..	X	0.40	4.00

[1] Operated and controlled by the Norsk Marconikompani

[2] Operated and controlled by the owners

[3] Operated and controlled by the Marconi Wireless Tel. Co. of America on behalf of the Norsk Marconikompani

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
NORWAY—*contd.*							Francs.	Francs.	
Golaa [3]	LGM	100-150	F. Siegwarth	300, **600**	P G	X	0.40	4.00	
Golden Gate [3]	LGR	435	Knut Knutsen	300, **600**	P G	X	0.40	4.00	
Governer Forbes [3]	LHA	300	A. O. Lindvig	300, **600**	P G	N	0.20	2.00	
Grena [3]	LHH	100-150	J. L. Mowinckel	300, **600**	P G	X	0.40	4.00	
Haakon VII. [3]	LDL	160	Det. Nordenfjeldske Dampskib.	300, 450, **600**	P G	1 to 3 a.m.; 7 to 9 a.m.; 1 to 3 p.m.; 7 to 9 p.m.	0.20	2.00	
Hallfried [3]	LFT	600	P. Kleppe	300, **600**	P G	X	0.40	4.00	
Hamlet [1]	LGD	160	Bruusgaard, Kiosturd & Co., Drammen	300, **600**	P G	X	0.20	2.00	
Hanna Nielsen [1]	LGI	200-250	B. Stolt Nielsen, Haugesund	300, **600**	P G	X	0.40	4.00	
Havö [3]	LDC	600	Henrik Östervold	300, **600**	P G	X	0.40	4.00	
Hercules LGY [3]	LGY	100-150	Norway-Mexico Gulf Line	300, **600**	P G	X	0.40	4.00	
Iris LFH [3]	LFH	120	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	X	0.20	2.00	
Irma [3]	LDQ	240	Det Bergenske Dampskibsselskab.	300, 450, **600**	P G	X	0.20	2.00	
Jason LEL [3]	LEL	110	A/S Norsk Bjergningskompani	300, **600**	P G	X	—	—	
Jupiter LEB [3]	LEB	135	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	2.30 to 3 a.m.; 8.30 to 9 a.m.; 2.30 to 3 p.m.; 8.30 to 9 p.m.	0.20	2.00	
Kalfarli [1]	LGF	200-250	D. Steen, Kristiania	300, **600**	P G	X	0.40	4.00	
Key West [3]	LGQ	435	Knut Knutsen	300, **600**	P G	X	0.40	4.00	
Kong Harald [3]	LDK	160	Det Nordenfjeldske Dampskibs-selskab.	300, **600**	P G	1 to 3 a.m.; 7 to 9 a.m.; 1 to 3 p.m.; 7 to 9 p.m.	0.20	2.00	
Landaas [3]	LHE	435	B. Stolt Nielsen	300, **600**	P G	X	0.40	4.00	
Landvard [3]	LGC	200-250	Government	300, **600**	P G	X	0.40	4.00	
Lidvard [3]	LGB	200-250	Government	300, **600**	P G	X	0.40	4.00	
Luise Nielsen [1]	LGJ	200-250	B. Stolt Nielsen, Haugesund	300, **600**	P G	X	0.40	4.00	
Lygenfjord [3]	LFM	100-150	Den Norske Amerika-Line	300, **600**	P G	X	0.40	4.00	
Maricopa [3]	LEE	100-150	Akties-Tankfart	300, **600**	P G	X	0.40	4.00	
Mesna [1]	LEV	—	Den Norske Afrika & Austral.	—	—	—	—	—	
Mexicano LDH [3]	LDH	270-320	Norway-Mexico Gulf Line	300, **600**	P G	8 a.m. to midnight	0.40	4.00	
Mira [3]	LFJ	120	Det Bergenske Dampskibsselskab	300, 450, **600**	P G	X	0.20	2.00	
Nevis [3]	LHN	—	Olaf Orvig	—	P G	X	0.40	4.00	

Nidaros [2]	LEK	110	A/S. Norsk Bjergningskompani	300, 600	P G	X	—	—	
Niels Nielsen [1]	LGH	200-250	B. Stolt Nielsen, Haugesund	300, 600	P G	X	0.40	4.00	
Noruega [1]	LDG	180	Norway-Mexico Gulf Line	300, 600	P G	X	0.40	4.00	
Örn II [1]	LDV	160-270	A/S. Ornen, Sandefjord	300, 450, 600	P G	X	0.40	4.00	
Preston LDW [2]	LDW	400	O. & A. Irgens	300, 600	P G	X	0.40	4.00	
Ragnvald Jarl [2]	LDJ	160	Det Nordenfjeldske Dampskib.	300, 450, 600	P G	1 to 3 a.m. 7 to 9 a.m. 1 to 3 p.m. 7 to 9 p.m.	0.20	2.00	
Ranenfjord [2]	LGS	00-2250	Den Norske Amerika-Line	300, 600	P G	X	0.40	4.00	
Regulus [2]	LHD	300	A. O. Lindvig	300, 600	P G	X	0.20	2.00	
Rena [2]	LFD	150-250	Den Norske Afrika- og Aust.	300, 600	P G	X	0.40	4.00	
Rio de Janeiro LDM [2]	LDM	150-250	Det Nordenfjeldske Dampskib.	300, 600	P G	X	0.40	4.00	
Rio de la Plata LDN [2]	LDN	150-250	Det Nordenfjeldske Dampskib.	300, 600	P G	X	0.40	4.00	
Rodskjaer [1]	LEP	—	Jacobsen & Co., Langesund	—	—	—	—	—	
Romsdalsfjord [2]	LEJ	100-150	Den Norske-Amerika Linje	300, 600	P G	X	0.40	4.00	
Rövoer [2]	LHG	100-150	J. K. Haaland	300, 600	P G	X	0.40	4.00	
Sagaland [2]	LGP	100-150	R. Amlie	300, 600	P G	X	0.40	4.00	
Salvage [2]	LFY	150-200	A/S. Norsk Bjergningskompani	300, 600	P G	X	—	—	
Salvator [2]	LEM	150-250	A/S. Norsk Bjergningskompani	300, 600	P G	X	—	—	
Simla [1]	LEW	—	Den Norske Afrika- & Aust.	—	—	—	—	—	
Sinaloa [2]	LHB	300	A. O. Lindvig	300, 600	P G	X	0.20	2.00	
Sjoa [1]	LEX	—	Den Norske Afrika- & Aust.	—	—	—	—	—	
Solstreif [1]	LHL	300	Chr. Nielsen & Co.	300, 600	P G	X	0.40	4.00	
Stavangerfjord [1]	LFS	150-200	Den Norske Amerika-Linje, Krist.	300, 600	P G	N	0.40	4.00	
Sterling LDB [2]	LDB	160	A/S Ganger Rolf	300, 600	P G	N	0.28	2.80	
Storviken [2]	LHJ	900	Haakon J. Wallem	300, 600	P G	X	0.40	4.00	
Strinda [2]	LFO	100-150	J. Ludwig Mowinckel	300, 600	P G	X	0.40	4.00	
Svend Foyn I [2]	LEC	215	A/S Sydhavet	300, 600	P G	X	0.40	4.00	
Talabot [2]	LFI	500	N. S. Bjonness & Son	300, 500, 600	P G	X	0.40	4.00	
Tanafjord [2]	LFA	100-150	Den Norske Amerika-Linje	300, 600	P G	X	0.40	4.00	
Thordis [2]	LDE	500	O. T. Tonnevold	300, 500, 600	P G	X	0.40	4.00	
Thorvald Halvorsen [1]	LGE	100-150	P. Kleppe, Bergen.	300, 600	P G	X	0.40	4.00	
Tysla [2]	LFF	150-250	Den Norske Afrika- og Aust.	300, 600	P G	X	0.40	4.00	
Urter	LEA	100-150	J. K. Haaland	300, 600	P G	X	0.40	4.00	
Utsire [2]	LHF	100-150	J. K. Haaland	300, 600	P G	X	0.40	4.00	
Vaarli [1]	LGG	200-250	Brödrene Odfjeli	300, 600	P G	X	0.40	4.00	
Venus LDO [2]	LDO	240	Det Bergenske Dampskibsselskab	300, 450, 600	P G	X	0.20	2.00	
Viking LGU [2]	LGU	200-250	M. Clausen	300, 600	P G	X	0.40	4.00	
Vinstra [2]	LFE	150-2 0	Den Norske Afrika- og Aust.	300, 600	P G	X	0.40	4.00	
Wellington LGO [1]	LGO	100-150	J. Saetveit	300, 600	P G	X	0.40	4.00	
Zeta [2]	LDR	150	Det Bergenske Dampskibsselskab.	300, 450, 600	P G	X	0.20	2.00	
PERU									
Huallaga [1]	OCH	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—	[1] Operated and controlled by the Marconi International Marine Com. Co., Ltd., London
Mantaro [1]	OCM	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—	
Ucayali [1]	OCU	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—	
Urubamba [1]	OCR	250	Cia Peruana Vap y Dique del Callao	300, 600	P G	X	0.40	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
PORTUGAL							Francs.	Francs.	
Adamaster	CTC	150	Navy	300, 450, **600**	O ..	N	—	—	[1] Operated and controlled by the Société Anonyme Internationale de Télégraphie sans fils, Brussels
Africa [1]	CSA	160	Comp. Nacional de Nav. (Lisbon)	300, 450, **600**	P G ..	N	0.40	4.00	
Almirante Reis ..	CTA	150	Navy	300, 450, **600**	O ..	N	—	—	
Amarante [1]	CUC	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Beira CSB [1]	CSB	160	Comp. Nacional de Nav. (Lisbon)	300, 450, **600**	P G ..	N	0.40	4.00	
Beira CTK	CTK	—	Navy	—	O ..	—	—	—	
Berrio	CTR	80	Navy	400	O ..	X	—	—	
Bolama [1]	CSO	100-150	Comp. Nacional de Nav. (Lisbon)	300, **600**	P G ..	X	0.40	4.00	
Chaimite	CTY	—	Navy	—	O ..	X	—	—	
Cinco D'Outubro ..	CTJ	—	Navy	—	O ..	—	—	—	
Coimbra [1]	CSK	100-150	Commissao Dos Transportes Mar. (Lisbon)	300, **600**	P G ..	N	0.40	4.00	
Congo [1]	CRG	100-150	Commissao Dos Transportes Mar. (Lisbon)	300, **600**	P G ..	N	0.40	4.00	
Cunene [1]	CSQ	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Dondo [1]	CSD	100-150	Comp. Nacional de Nav. (Lisbon)	300, **600**	P G ..	X	0.40	4.00	
Douro CTG	CTG	—	Navy	—	O ..	—	—	—	
Espadarte	CTF	—	Navy	—	O ..	—	—	—	
Extremadura CSJ [1] ..	CSJ	100-150	Comp. Nacional de Nav. (Lisbon)	300, **600**	P G ..	X	0.40	4.00	
Faro [1]	CRN	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Fernao Veloso [1] ..	CSG	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Figuera [1]	CRX	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Funchal [1]	CSF	100-150	Empreza Insulana de Nav. (Lisbon)	300, **600**	P G ..	X	0.40	4.00	
Gaza [1]	CRH	100-150	Commissao dos Transportes Mar. (Lisbon)	300, **600**	P G ..	N	0.40	4.00	
Gaia [1]	CSI	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—	
Gil Eannes [1]	PQA	150	Commissao dos Transportes Mar. (Lisbon)	600	O ..	X	—	—	
Goa [1]	CUA	100	Commissao dos Transportes Mar. (Lisbon)	300, **600**	P G ..	N	0.40	4.00	
Granja [1]	CUJ	100-150	Commissao dos Transportes Mar. (Lisbon)	300, **600**	P G ..	X	0.40	4.00	

Guardiana CTH ..	CTH	—	Navy	—	O ..	—	—	—
Ibo	CTL	—	Navy	—	O ..	—	—	—
India[1]	CUI	Day 150 Night 250	Commissao dos Transportes Mar. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Kionga	CTQ	20	Navy	600	O ..	X	—	—
Lagos[1]	CRI	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
Lima CSN[1]	CSN	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Loanda[1]	CSL	100-150	Comp. Nacional de Nav. (Lisbon)	300, 600	P G ..	X	0.40	4.00
Lourenço Marques[1] ..	CRJ	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Maio[1] CRK	CRK	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Minho[1]	CUM	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	X	0.40	4.00
Moçambique[1]	CRV	160	Comp. Nacional de Nav. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Mormugao[1]	CUH	325	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
Mossamedes[1]	CSR	160-250	Comp. Nacional de Nav. (Lisbon)	300, 450, 600	P G ..	—	—	—
Pangim[1]	CSW	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—
Patria CTZ	CTZ	—	Navy	—	O ..	—	—	—
Pedro Nunes	CTP	300	Navy	600	O ..	X	—	—
Peniche[1]	CSX	100-150	Furness, Withy & Co., Ltd. (London)	300, 600	P G ..	X	0.40	4.00
Peninsular[1]	CSR	100-200	Comp. Nacional de Nav. (Lisbon)	300, 450, 600	P G ..	X	0.40	4.00
Porto[1]	CRR	150-200	Cunard Co., Ltd. (Liverpool) ..	300, 600	P G ..	X	0.40	4.00
Porto Alexandre[1] ..	CRM	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
Portugal[1]	CSP	160	Comp. Nacional de Nav. (Lisbon)	300, 450, 600	P G ..	N	0.40	4.00
Quelimane[1]	CUQ	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
Republica CTE ..	CTE	—	Navy	—	O ..	—	—	—
Republica CTN ..	CTN	40	Navy	600	O ..	X	—	—
Sacavem[1]	CRW	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—
Sado[1]	CSC	—	Commissao dos Transportes Mar. (Lisbon)	—	—	—	—	—
San Gabriel	CTD	150	Navy	300, 450, 600	O ..	N	—	—
San Jorge[1]	CUS	150-200	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
San Miguel[1]	CSS	100-150	Empreza Insulana de Nav. (Lisbon)	300, 600	P G ..	X	0.40	4.00
Sines[1]	CRL	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—
Tejo	CTI	—	Navy	—	O ..	—	—	—
Tras-os-Montes[1] ..	CST	—	Furness, Withy & Co., Ltd. (London)	—	—	—	—	—
Vasco da Gama CTB ..	CTB	150	Navy	300, 450, 600	O ..	N	—	—
Viana[1]	CUO	100-150	Commissao dos Transportes Mar. (Lisbon)	300, 600	P G ..	N	0.40	4.00
Vulcano CTM	CTM	—	Navy	—	O ..	—	—	—
Zaire[1]	CSZ	100-150	Comp. Nacional de Nav. (Lisbon)	300, 600	P G ..	X	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radiotelegram.	Notes.
ROUMANIA							Francs.	Francs.	
Dacia CVD[1]	CVD	240	Government Marine Department	**600**	P R	N	0.30	3.00	[1] Operated and controlled by the owners
Imperatul Traian[1]	CVF	240	Government Marine Department	**600**	P R	N	0.30	3.00	
Principesa Maria[1]	CVM	240	Government Marine Department	**600**	P R	N	0.30	3.00	
Regele Carol I.[1]	CVC	240	Government Marine Department	**600**	P R	N	0.30	3.00	
Romania[1]	CVR	240	Government Marine Department	**600**	P R	N	0.30	3.00	
RUSSIA									
Astrachan[1]	RON	Day 100 Night 250	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	4.00	[1] Operated and controlled by the owners [3] Operated and controlled by the Société Anonyme Internationale de Tel. sans fil, Brussels
Bessarabia[3]	RSG	—	P. Regier & Son, Odessa	—	—	—	—	—	
Cezarevitch George[1]	RPF	300	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	4.00	
Czar[1]	RSC	160	Russian E. Asiatic Co.	300, **600**	P G	N	0.40	4.00	
Eclips[1]	REE	430	Department of Marine	300, **600**, 900	P	X	0.40	—	
Ekaterina[3]	RNA	—	J. Wishaw, Petrograd	—	—	—	—	—	
Emperor Alexander III[1]	RPU	450	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0. 0	—	
Emperor Nicolas I.[1]	RPM	450	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	
Emperor Nicolas II.[1]	RPB	450	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	
Emperor Peter the Great[1]	RPP	450	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	

Empress Ekaterina II.[1]	RPS	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Erivan[1]	RNQ	350	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Euphrate RPD[1] ..	RPD	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Grand Duchess Maria Nikolaievna[1]	RNI	200	Volunteer Fleet	600	P ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Grand Duchess Xenia[1]	RPG	300	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Grand Duchess Xenia Alexandrovna[1]	ROD	300	Commercial Nav. School	300, 600	P G ..	2 to 3 p.m. 8 to 9 p.m.	—	—
Grand Duke Alexis[1] ..	RPQ	300	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Grand Duke Constantine[1]	RPO	300	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Herta[1]	RHE	430	Department of Marine	300, 600, 900	P ..	X	0.40	—
Iolanda[1]	—	200	Mad. Elisabeth Terestchenko ..	300, 600	P G ..	X	0.40	—
Irtysh[1]	ROJ	60	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Jerousalim[1]	RPI	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Kherson[1]	RNJ	250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	
Kishinev[1]	RNC	250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	
Kolyma[1]	ROG	Day 100 Night 200	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Mitau[1]	RSA	200	Russian E. Asiatic Co.	300, 600	P G ..	N	0.40	—
Moghilev[1]	—	—	Volunteer Fleet	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
RUSSIA—*contd.*							Francs.	Francs.	
Nijni Novgorod [1]	RNE	250	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	
Odess [1]	RPE	450	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	
Penza [1]	RSZ	250	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	
Peter Weliki [1]	RPR	110	Comm. of Riga Stock Exchange	300, **600**	P G	—	0.40	—	
Polezny [1]	RPZ	100	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	
Princess Eugenie of Oldenburg [1]	RPH	300	Russian S.N. & Trad. Co.	300, **600**	P G	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—	
Rossiya RSR [1]	RSR	200	Russian E. Asiatic Co.	300, **600**	P G	N	0.40	—	
Saratov [1]	RNG	250	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	
Simbirsk [1]	ROC	Day 100 Night 2 0	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	
Simferopol [1]	RSP	250	Volunteer Fleet	300, **600**, 900	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	
Sisban [1]	ROB	Day 100 Night 200	Volunteer Fleet	300, **600**	P G	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—	

Stavropol[1]	RNS	100	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Sviatoi Nicolai[1] ..	RPX	300	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Tchihachoff[1]	RPC	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Tigre[1]	RPT	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Tobolsk[1]	ROQ	Day 100 Night 250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Tomsk[1]	ROF	Day 100 Night 250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Toula[1]	RNB	250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Tver[1]	RNT	210	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
Tzar Michael Theodorowitch[1]	RPV	450	Russian S.N. & Trad. Co. ..	300, 600	P G ..	2 to 4 a.m. midday to 2 p.m. 6 to 8 p.m.	0.40	—
Vladimir[1]	RNV	250	Volunteer Fleet	300, 600	P G ..	8 to 10 a.m. 1 to 4 p.m. 8 p.m. to midnight	0.40	—
SIAM								
Bali HGC	HGC	—	Government	300, 600	O ..	—	—	—
Sua Kamrensindhu ..	HGE	—	Government	300, 600	O ..	—	—	—
Sua Tayanchol.. ..	HGD	—	Government	300, 600	O ..	—	—	—
SOUTH AFRICA (UNION OF)								
Ludwig Wiener ..	VNA	100	Government	300, 600	O ..	—	—	—
S. Africa	—	—	S. African S.N. Co.	—	—	—	—	—
Miramichi	—	—	S. African S.N. Co.	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.
SPAIN							Francs.	Francs.
Ade'ina [2]	EDF	—	Cia Barcelonesa de Naveg.	—	—	—	—	—
Adolfo [2]	EEY	150-200	Soc. Naviera "Elcano"	300, **600**	P G	X	0.30	3.00
Agustina Forner [2]	HLH	—	—	—	—	—	—	—
Aizkori Mendi [2]	HMF	—	Cia Naviera Sota y Aznar	—	—	—	—	—
Alava [2]	CMS	—	Cia Naviera Mundaca	300, **600**	P G	X	0.30	3.00
A. Lazaro [1]	EEL	180	Cia Trasmediterranea	300, 450, **600**	P G	—	0.30	3.00
Albal [2]	CMW	150	Cia Espanola de Naveg. S.A.	300, **600**	P G	N	0.30	3.00
Alberto [2]	TIA	—	—	—	—	—	—	—
Alfonso XII. [2]	EDD	269	Cia Transatlantica	300, **600**	P G	N	0.30	3.00
Alfonso XIII. EBB	EBB	550	Navy	600, **900**, 1,200	O	N	—	—
Alfonso XIII. EDT [2]	EDT	269	Cia Transatlantica	300, **600**	P G	N	0.30	3.00
Alfonso Fierro [2]	TIB	—	—	—	—	—	—	—
Alicante [2]	EDA	269	Cia Transatlantica	300, **600**	P G	N	0.30	3.00
Almirante Lobo	EBN	140	Government	300, **600**, 900	O	N	—	—
Alvaro de Bazan	EBM	81	Navy	300, **600**	O	N	—	—
Ampurdan [2]	—	—	Hijos de Enrique Gir.	—	—	—	—	—
Andalucia [2]	EED	—	Cia Trasmediterranea	300, **600**	P G	—	0.30	3.00
Andraka Mendi [2]	HMH	150	Cia Naviera Sota y Aznar	300, **600**	P G	N	0.30	3.00
Angel B. Perez [2]	ECD	100-150	Don Carlos Latorre	300, **600**	P G	X	0.30	3.00
Antonio Lopez [2]	EDL	269	Cia Transatlantica	300, **600**	P G	N	0.30	3.00
Apolo [2]	CMA	—	Cia Anonima Mar. Union	300, **600**	P G	X	0.30	3.00
Aragon [2]	EEM	—	Cia Trasmediterranea	300, **600**	P G	—	0.30	3.00
Arantzazu [2]	HMJ	—	Cia de Navegation Ben.	—	P G	—	0.30	3.00
Arenas [2]	TIC	—	—	—	—	—	—	—
Armando [2]	TID	—	—	—	—	—	—	—
Arnabal Mendi [2]	HMI	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00
Arno Mendi [2]	TIE	—	—	—	—	—	—	—
Arnus [2]	HNC	250	Cia de Tabacos de Filipianos	—	P G	—	0.30	3.00
Arraiz	TIF	—	—	—	—	—	—	—
Arriluze [2]	ECG	—	Soc. Minera de Villaodrid	300, **600**	P G	X	0.30	3.00
Artigan Mendi [2]	CXU	200	Cia Nav. Sota y Aznar	300, **600**	P G	N	0.30	3.00
Astondo Mendi [2]	HMK	—	Cia Nav. Sota y Aznar	—	P G	—	0.30	3.00
Atlante [1]	EFA	—	Cia Trasmediterranea	300, **600**	P G	X	0.30	3.00
Audaz	EHQ	—	Navy	—	O	—	—	—
Auzias March [1]	EEA	180	Cia Trasmediterranea	300, 450, **600**	P G	—	0.30	3.00
Azpeitia [2]	HNI	—	Cia de Nav. Bengolea	—	P G	—	0.30	3.00
Bachi [2]	TIG	—	—	—	—	—	—	—
Balmes [2]	ECA	275	Pinillos Izquierdo y Cia	300, 450, **600**	P G	N	0.30	3.00

Notes.

[1] Wireless apparatus is property of the ship-owners, but operated by Cia Nac. de Telegrafia Sin Hilos

[2] Wireless apparatus is operated and controlled by Cia Nac. de Telegrafia Sin Hilos

Banana[2]	TIH	—	—	—	—	—	—	—
Banderas	TII	—	—	—	—	—	—	—
Bara-bi[2]	TIJ	—	—	—	—	—	—	—
Baracaldo[2]	TIK	—	—	—	—	—	—	—
Barcelo[1]	EEB	180	Cia Trasmediterranea	300, 450, 600	P G ..	—	0.30	3.00
Barcelona ECB[2] ..	ECB	300	Pinillos Izquierdo y Cia	300, 450, 600	P G ..	N	0.30	3.00
Bartolo[2]	CMT	—	Cia Navieri Bachi	—	P G ..	—	0.30	3.00
Basconia[2]	HLB	—	Zalbide y Zulaica	—	P G ..	—	0.30	3.00
Begona No. 1[2]	HLN	—	Luis Ibran	—	P G ..	—	0.30	3.00
Begonia No. 2[2] ..	HLQ	150	M. de Urguijo y Cia	300, 600	P G ..	N	0.30	3.00
Begonia No. 3[2] ..	HLX	—	M. de Urguijo y Cia	—	P G ..	—	0.30	3.00
Begonia No. 4[2] ..	CMV	—	M. de Urguijo y Cia.	—	P G ..	—	0.30	3.00
Bermeo[2]	TIL	—	—	—	—	—	—	—
Betis[2]	TIM	—	—	—	—	—	—	—
Biskargi Mendi[2] ..	HMN	—	Cia Naviera Sota y Aznar ..	—	P G ..	—	0.30	3.00
Blas de Lezo[2]	TIN	—	—	—	—	—	—	—
Bonifaz	EBR	220	Navy	300, 450, 600	O ..	N	—	—
Buenos Aires EDB[2] ..	EDB	269	Cia Transatlantica	300, 600	P G ..	N	0.30	3.00
Bustamante	EBO	140	Navy	300, 450, 600	O ..	N	—	—
Cabanal[1]	EEC	180	Cia Trasmediterranea	300, 450, 600	O ..	N	—	—
Cabo Carvoeira[2] ..	CXS	—	Ibarra y Compania	—	P G ..	—	0.30	3.00
Cabo Cervera[2] ..	ECU	—	Ibarra y Compania	300, 600	P G ..	—	0.30	3.00
Cabo Creus	TIO	—	—	—	—	—	—	—
Cabo Menor[2]	CXM	—	Ibarra y Compania	—	P G ..	—	0.30	3.00
Cabo Socratif[1] ..	—	—	Ibarra y Compania	—	—	—	—	—
Cabo tres Forcas[2] ..	ECK	—	Ibarra y Compania	300, 600	P G ..	—	0.30	3.00
Cadarso	EBQ	14	Navy	300, 450, 600	O ..	N	—	—
Cadiz[2]	ECC	300	Pinillos Izquiero y Cia	300, 450, 600	P G ..	N	0.30	3.00
Canalejas[1]	EEK	100	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00
Capitan Segarra[2] ..	HMG	250	Cia Trasmediterranea	300, 600	P G ..	N	0.30	3.00
Carolina E. De Perez[2]	ECF	100-150	Don Angel F. Perez	300, 600	P G ..	X	0.30	3.00
Castilla[1]	EEQ	—	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00
Castro Alen	TIP	—	—	—	—	—	—	—
Catalina[2]	ECT	300	Pinillos Izquierdo y Cia	300, 450, 600	P G ..	N	0.30	3.00
Cataluna EDC[2] ..	EDC	108	Cia Transatlantica	300, 600	P G ..	N	0.30	3.00
Cataluna EEU[2] ..	EEU	—	Cia Trasmediterranea	—	P G ..	—	0.30	3.00
Cataluna EBF ..	EBF	216	Navy	300, 450, 550	O ..	N	—	—
Cervera[2]	TIQ	—	—	—	—	—	—	—
Ciervana[2]	TIR	—	—	—	—	—	—	—
Cirilo Amoros[2]	HLC	—	Cia Trasmediterranea	—	P G ..	—	0.30	3.00
Ciudad de Cadiz[2] ..	EDZ	108	Cia Trasatlantica	300, 600	P G ..	N	0.30	3.00
Claudio[2]	CMK	—	Cia Naviera Euzkera	—	P G ..	—	0.30	3.00
C. Lopez v. Lopez ..	EDH	—	Cia Trasatlantica	300, 600	P G ..	N	0.30	3.00
Concha[2]	HMA	—	Ricardo Ortiz Artinano	—	P G ..	—	0.30	3.00
Conde de Abasolo[2] ..	TIS	—	Cia Naviera Vascongada	—	—	—	—	—
Conde de Zubiria[2] ..	CMZ	—	Altos Ornos de Vizaya	—	P G ..	—	0.30	3.00
Conde Wifredo[2] ..	ECW	300	Pinillos Izquierdo y Cia	300, 450, 600	P G ..	N	0.30	3.00
Cosme y Jacinta ..	TIT	—	—	—	—	—	—	—
Cresalubi[2]	HMD	—	Cia de Nav. Bengolea	—	P G ..	—	0.30	3.00
Cristina Rueda[2] ..	TIU	—	—	—	—	—	—	—
Cristobal Llusa[2] ..	TIV	—	—	—	—	—	—	—
Delfin CLD	CLD	—	Navy	—	O ..	—	—	—
Delfin EFD[1]	EFD	—	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00
Donato[2]	TIW	—	—	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SPAIN—*contd.*							Francs.	Francs.	
Donostia [2]	HNJ	—	Cia Anonima de Nav.	—	P G	—	0.30	3.00	
Dorado	CLE	—	Navy	—	O	—	—	—	
Durango	TIX	—	—	—	—	—	—	—	
Elanohove [2]	TLA	—	—	—	—	—	—	—	
Elcano [2]	TLD	—	—	—	—	—	—	—	
Emilia S. De Perez [2]	ECE	300	A. F. Perez	300, 450, **600**,	P G	N	0.30	3.00	
Emperador Carlos V.	EBE	243	Navy	300, **750**	O	N	—	—	
Enrique Ballesteros [2]	—	—	Cia Maritima Ballesteros	—	—	—	—	—	
Eolo [2]	CME	—	Cia Anonima Mar. Union	300, **600**	P G.	X	0.30	3.00	
Eretza Mendi [2]	HMO	250	Cia Naviera Sota y Aznar	300, **600**	P G	N	0.30	3.00	
Escolano [2]	TIY	—	—	—	—	—	—	—	
Espana	EBA	550	Navy	600, **900**, 1,200 1,500, 1,800	O	N	—	—	
Espana No. 1 [2]	TIZ	—	El Consejo de Admin. y Gerencia de los buques incaplarados por el Estado Espanol						
Espana No. 2 [2]	TJA	—							
Espana No. 3 [2]	TJB	—							
Espana No. 4 [1]	TJC	—							
Espana No. 5 [2]	TJD	—							
Espana No. 6 [1]	TJE	—							
Euzkera [2]	CMY	—	Cia Naviera Euzkera	—	P G	—	0.30	3.00	
Extremadura EBJ	EBJ	43	Navy	300, **525**	O	N	—	—	
Faustino R. San Pedro [2]	CMD	—	Altos Hornos de Vizcaya	300, **600**	P G	X	0.30	3.00	
Felix [2]	TJF	—	—	—	—	—	—	—	
Florinda [2]	EDR	—	Cia Barcelonesa de Nav.	—	P G	—	0.30	3.00	
Fuerteventura [2]	EFY	150	Canary Interinsular Mail S.S. Co.	300, **600**	P G	N	0.30	3.00	
Galdames [2]	ECX	—	Cia Auxilier Marit. S.A.	—	P G	—	0.30	3.00	
Galea [2]	CXB	—	Cia Naviera Guipuzcoana	300, **600**	P	X	0.30	3.00	
Gaviota CLF	CLF	—	Navy	—	O	—	—	—	
Gen. Fernandes Silvestre [1]	EEN	120	Cia Trasmediterranea	300, **600**	P G	8 a.m. to 4 p.m. 8 to 12 p.m.	0.30	3.00	
Giralda	EBI	270	Government	200, 500, **600**, 1,200	O	N	—	—	
Gloria	TJG	—	—	—	—	—	—	—	
Goisoko-Izarra [2]	TJH	—	—	—	—	—	—	—	
Gorbea Mendi [2]	HMP	—	Cia Nav. Sota y Aznar	—	P G	—	0.30	3.00	
Grao [1]	EEG	100	Cia Trasmediterranea	300, **600**	P G	—	0.30	3.00	
Guillermo [2]	TJI	—	—	—	—	—	—	—	
Guipuzcoa [2]	CXZ	—	Cia Nav. Mundaca	—	P G	—	0.30	3.00	

Hercules [2]	CMH	—	Cia Anonima Mar. Union	—	P G	—	0.30	3.00
Hernan Cortés	EHT	—	Navy	—	O	—	—	—
Hesperides EFH [1]	EFH	300	Cia Trasmediterranea	300, 450, 600	P G	N	0.30	3.00
Ibai Patxo [2]	HMZ	100	Cia Maritima Ibai	300, 600	P G	N	0.30	3.00
Ibaizabal [2]	HLI	150	Hernandez Mendirichagay Cia	—	P G	—	0.30	3.00
Igotz-Mendi [2]	HMQ	250	Cia Naviera Sota y Aznar	300, 600	P G	N	0.30	3.00
Igualada	TJK	—	—	—	—	—	—	—
Iluntzar-Mendi [2]	HMR	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00
Ines [2]	ECI	100-150	Soc. Naviera Elcano	300, 600	P G	X	0.30	3.00
Infanta Isabel ECY [2]	ECY	300	Pinillos Izquierdo y Cia	300, 450, 600	P G	N	0.30	3.00
Infanta Isabel EBL	EBL	216	Navy	300, 450	O	N	—	—
Infanta Isabel de Borbon [2]	EDI	431	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Isaac Peral	EHP	—	Navy	—	O	—	—	—
Isabel de Llusa [2]	TJJ	—	—	—	—	—	—	—
Isla de Panay [2]	EDP	269	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Iturri-Azkar [2]	CMI	—	Cia Nav. " Iturri "	—	P G	—	0.30	3.00
Iturri-Ederra [2]	HLE	—	Cia Nav. " Iturri "	300, 600	P G	X	0.30	3.00
Iturri-Gorri [2]	HLG	—	Cia Nav. " Iturri "	—	P G	—	0.30	3.00
Iturri Urdina [2]	TJL	—	—	—	—	—	—	—
Jacinto Verdaguer [2]	EEV	—	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
Jaime Girona [2]	ECJ	250	Altos Ornos de Vizcaya	300, 600	P G	X	0.30	3.00
Jaime I	EBC	550	Navy	600, 900, 1,200 1,500, 1,800	O	N	—	—
Jata Mendi	—	—	Cia Nav. Sota y Aznar	—	—	—	—	—
Jatiba [1]	EEI	100	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
Jaume d'Urgell [2]	EFZ	—	Hijos de Jose Taya	300, 600	P G	—	0.30	3.00
J. B. Llevera [1]	EEH	100	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
J. S. Sister [1]	EES	180	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
Joaquin Pujol [2]	TJN	—	—	—	—	—	—	—
Jorge Juan [1]	EEJ	180	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
José Villalonga [2]	CMF	—	Altos Hornos de Viscaya	300, 600	P G	X	0.30	3.00
Juan Maragall [2]	HLJ	—	Cia Trasmediterranea	—	P G	—	0.30	3.00
Juliana [2]	EDX	—	Cia Barcelonesa de Nav.	300, 600	P G	—	0.30	3.00
Jupiter CMJ [2]	CMJ	—	Cia Anonima Marit. Union	300, 600	P G	—	0.30	3.00
J. Y. C. Llusa [2]	TJM	—	—	—	—	—	—	—
Lauria	EBS	220	Navy	300, 450, 600, 900	O	N	—	—
Laya	EBT	220	Navy	300, 450, 600, 900	O	N	—	—
Legazpi [2]	EDG	269	Cia Trasatlantica	300, 450, 600	P G	N	0.30	3.00
Leon XIII [2]	EDO	431	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Leonora [2]	CXJ	—	El Naviero Domingo Numbru	—	P G	—	0.30	3.00
Lily	TJO	—	—	—	—	—	—	—
Luis A. Goni [2]	TJP	—	—	—	—	—	—	—
Luis Casanova [2]	TJQ	—	—	—	—	—	—	—
Macarena [2]	HML	—	Don W. Gonzalez Garra	—	—	—	—	—
Madrid TJR [2]	TJR	—	Figueroa y Campos	—	—	—	—	—
Maliano [2]	TJZ	—	—	—	—	—	—	—
Manu [2]	TJS	—	—	—	—	—	—	—
Manuel Calvo [2]	EDM	269	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Manuel Carsi [2]	TLC	—	—	—	—	—	—	—
Mar Adriatico [2]	TJT	—	—	—	—	—	—	—
Mar Blanco [2]	TJU	—	—	—	—	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SPAIN—*contd.*							Francs.	Francs.	
Mar Cantabrico [2]	CXR	—	Cia Marit. del Nervion	—	P G	—	0.30	3.00	
Mar Caribe [2]	TJV	—	—	—	—	—	—	—	
Mar Caspio [2]	EFG	—	—	—	—	—	—	—	
Mar del Norte [2]	CXF	—	Cia Marit. del Nervion	—	P G	—	0.30	3.00	
Mar del Plata	TJW	—	—	—	—	—	—	—	
Margari [2]	TJX	—	—	—	—	—	—	—	
Marie de Molina	EHW	—	Navy	—	O	—	—	—	
Marie Elena [2]	TJY	—	Luis Liano y Cia	—	—	—	—	—	
Marie Teresa [2]	HMU	—	Ponte y Munis	—	P G	—	0.30	3.00	
Mar Mediterraneo [2]	CXH	150	Cia Marit. del Nervion	300, **600**	P G	N	0.30	3.00	
Mar Negro [2]	CMN	—	—	—	—	—	—	—	
M. Arnus [2]	HLM	—	Hijos de José Taya	—	P G	—	0.30	3.00	
Marques del Turia [2]	HLT	—	Cia Trasmediterranea	—	P G	—	0.30	3.00	
Marques de Campo [2]	CXW	—	Cia Trasmediterranea	—	P G	—	0.30	3.00	
Marques de Chavarri [2]	HLW	—	Altos Hornos de Vizcaya	—	P G	—	0.30	3.00	
Marques de Molins	EHU	—	Navy	—	O	—	—	—	
Marques de Urquijo [2]	ECN	—	Altos Hornos de Vizcaya	300, **600**	P G	X	0.30	3.00	
Marques de la Victoria	EHV	—	Navy	—	O	—	—	—	
Mar Rojo [2]	ECH	—	Cia Marit. del Nervion	—	P G	—	0.30	3.00	
Marte [2]	CMM	—	Cia Anonima Marit. Union	300, **600**	P G	X	0.30	3.00	
Martin Saenz [2]	ECZ	300	Pinillos Izquierdo y Cia	300, 450, **600**	P G	N	0.30	3.00	
Mar Tirreno [2]	ECM	150	Cia Marit. del Nervion	300, 450, **600**	P G	X	0.30	3.00	
Marzo [2]	CMQ	—	Cia Bilbaina de Nav.	—	P G	—	0.30	3.00	
Mercurio [2]	TKA	—	—	—	—	—	—	—	
M. L. Villaverde [2]	EDW	108	Cia Trasatlantica	300, **600**	P G	X	0.30	3.00	
M. M. Pinillos [2]	ECP	300	Pinillos Izquierdo y Cia	300, 450, **600**	P G	N	0.30	3.00	
Monte Video EDV [2]	EDV	269	Cia Trasatlantica	300, **600**	P G	N	0.30	3.00	
Montserrat [2]	EDN	269	Cia Trasatlantica	300, **600**	P G	N	0.30	3.00	
Mouro [2]	ECO	180	Cia Vasco Cantabrica de Nav.	300, 400, **600**	P G	X	0.30	3.00	
Navarra EDY [2]	EDY	—	Cia Naviera Mundaca	—	P G	—	0.30	3.00	
Navarra EEX [2]	EEX	—	Cia Trasmediterranea	—	P G	—	0.30	3.00	
Nautilus EBV	EBV	140	Navy	**600**, 900, 1,200	O	N	—	—	
Nuria [2]	—	—	Cia Barcelonea de Nav.	—	—	—	—	—	
Olavarria [2]	CMO	—	Cia Marit. del Nervion	300, **600**	P G	X	0.30	3.00	
Olesa	TLB	—	—	—	—	—	—	—	
Ordunte Mendi [2]	HMT	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00	
Orzarosa [2]	TKB	—	—	—	—	—	—	—	
Osado	EHO	—	Navy	—	O	—	—	—	

Otoyo[1]	CXO	—	Cia de Nav. La Blanca	—	P G	—	0.30	3.00
Paulina[2]	HLP	—	Cia Barcelonesa de Nav.	—	P G	—	0.30	3.00
Paz de Epalza[2]	TKC	—	—	—	—	—	—	—
P. Claris[2]	ECL	400	Hijos de Jose Taya	300, 450, 600	P G	X	0.30	3.00
P. de Satrustegui[2]	EDS	431	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Pelayo	EBD	270	Navy	300, 600, 900 1,200	O	N	—	—
Pena Augustina	TKD	—	—	—	—	—	—	—
Pena Cabarga	TKE	—	—	—	—	—	—	—
Pena Rocias	TKF	—	—	—	—	—	—	—
Peris Valero[2]	HLO	—	Cia Trasmediterranea	—	P G	—	0.30	3.00
Posta Querol[2]	TKG	—	—	—	—	—	—	—
Previsor[2]	TKH	—	—	—	—	—	—	—
Princesa de Asturias	EBG	324	Navy	300, 600, 800, 1,000	O	N	—	—
Proserpina	EHR	150	Navy	—	O	—	—	—
Ramon[2]	CMR	—	Cia Naviera Euskera	300, 600	P G	N	0.30	3.00
Ramon de Bikuna[2]	TKI	—	—	—	—	—	—	—
Ramon Numbru[2]	TKJ	—	Don Domingo Numbru	—	—	—	—	—
Ramonita	TKK	—	—	—	—	—	—	—
Recalde	EBU	220	Navy	300, 450, 600, 900	O	N	—	—
Reina Maria Cristina[2]	EDK	431	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
Reina Regente	EBH	270	Navy	300, 600, 700, 1,000	O	N	—	—
Reina Victoria[1]	EFV	300	Cia Trasmediterranea	300, 450, 600	P G	N	0.30	3.00
Reina Victoria Eugenia[2]	EDU	431	Cia Trasatlantica	—	—	N	0.30	3.00
Rio de la Plata EBK	EBK	—	Navy	—	O	N	—	—
Rita HLR[2]	HLR	—	Hijos de Jose Taya	—	P G	—	0.30	3.00
Rita HNA[2]	HNA	—	Hijos de Enrique Gironella	—	P G	—	0.30	3.00
Roger de Flor[2]	HLF	—	Cia Trasmediterranea	—	P G	—	0.30	3.00
Roger de Lluria[2]	ECQ	—	Hijos de Jose Taya	300, 600	P G	—	0.30	3.00
Romeu[2]	TKL	—	—	—	—	—	—	—
Rontegui[2]	TKM	—	—	—	—	—	—	—
Rosario[2]	ECS	—	Cia Naviera Guipuzcoana	—	P G	—	0.30	3.00
Rosendo Masia[2]	TKN	—	—	—	—	—	—	—
Salvadora[2]	HLV	150	Uribe y Eguiraun	300, 600	P G	N	0.30	3.00
San Carlos[2]	EDQ	250	Cia Trasatlantica	300, 600	P G	N	0.30	3.00
San José[2]	TKO	—	—	—	—	—	—	—
Santa Ana[2]	TKP	—	—	—	—	—	—	—
Santa Isabel[2]	EDJ	270	Cia Transatlantica	300, 600	P G	N	0.30	3.00
Sebastian TKQ[2]	TKQ	—	F. Sainze Inchaustegui	—	—	—	—	—
Sendeja[2]	HND	—	Cia Maritima Bilbao	—	P G	—	0.30	3.00
Serafin Ballesteros[2]	TKR	—	Cia Maritima Ballesteros	—	—	—	—	—
Serra[2]	HLS	—	T. Fierro e Hijos	—	P G	—	0.30	3.00
Submarino A.1	EHX	—	Navy	—	—	—	—	—
Submarino A. 2	EHY	—	Navy	—	—	—	—	—
Submarino A. 3	EHZ	—	Navy	—	—	—	—	—
Tablada[2]	TKS	—	—	—	—	—	—	—
Tambre[1]	EEZ	—	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
Teodoro L'orente[1]	EET	100	Cia Trasmediterranea	300, 600	P G	—	0.30	3.00
Teresa[2]	TKT	—	—	—	—	—	—	—
Teresa Fabregas[2]	CXT	—	Cia de Nav. Fabregas y Garcia	—	P G	—	0.30	3.00
Teresa Pamies[2]	EFE	—	Cia de Nav. Fabregas y Garcia	300, 600	P G	X	0.30	3.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge.		Notes.
							Per Word.	Minimum per Radio-telegram.	
SPAIN—*contd.*							Francs.	Francs.	
Teresa Taya [2]	ECR	100	Hijos de Jose Taya	300, 450, **600**	P G	N	0.30	3.00	
Terror	EHS	—	Navy	—	O	—	—	—	
Tirso [2]	HNH	—	Hijos de Enrique Gironella	—	P G	—	0.30	3.00	
Tordera [2]	HLK	—	Cia Trasmediterranea	—	P G	—	0.30	3.00	
Torpedero No. 1	EHA	—	Navy	—	O	—	—	—	
Torpedero No. 2	EHB	—	Navy	—	O	—	—	—	
Torpedero No. 3	EHC	—	Navy	—	O	—	—	—	
Torpedero No. 4	EHD	—	Navy	—	O	—	—	—	
Torpedero No. 5	EHE	—	Navy	—	O	—	—	—	
Torpedero No. 6	EHF	—	Navy	—	O	—	—	—	
Torpedero No. 7	EHG	—	Navy	—	O	—	—	—	
Torpedero No. 8	EHH	—	Navy	—	O	—	—	—	
Torpedero No. 9	EHI	—	Navy	—	O	—	—	—	
Torpedero No. 10	EHJ	—	Navy	—	O	—	—	—	
Torpedero No. 11	EHK	—	Navy	—	O	—	—	—	
Torpedero No. 12	EHL	—	Navy	—	O	—	—	—	
Torpedero No. 13	EHM	—	Navy	—	O	—	—	—	
Torpedero No. 14	EHN	—	Navy	—	O	—	—	—	
Torpedero No. 15	CLA	—	Navy	—	O	—	—	—	
Torpedero No. 16	CLB	—	Navy	—	O	—	—	—	
Torpedero No. 17	CLC	—	Navy	—	O	—	—	—	
Torpedero No. 18	CLG	—	Navy	—	O	—	—	—	
Torpedero No. 19	CLH	—	Navy	—	O	—	—	—	
Torpedero No. 20	CLI	—	Navy	—	O	—	—	—	
Torpedero No. 21	CLJ	—	Navy	—	O	—	—	—	
Torpedero No. 22	CLK	—	Navy	—	O	—	—	—	
Torpedero No. 23	CLL	—	Navy	—	O	—	—	—	
Torpedero No. 24	CLM	—	Navy	—	O	—	—	—	
Torras y Bages [2]	EEE	—	Cia Trasmediterranea	—	P G	—	0.30	3.00	
Torre Blanca [2]	EFP	130	Cia Trasmediterranea	300, **600**	P G	X	0.30	3.00	
Torre del Oro [2]	TKU	—	—	—	—	—	—	—	
Trini [2]	HNL	—	Hijos de Enrique Gironella	—	P G	—	0.30	3.00	
Turia [2]	EFU	250	Cia Trasmediterranea	300, 450, **600**	P G	N	0.30	3.00	
Unbe Mendi [2]	HMV	250	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00	
Upo Mendi [2]	HMW	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00	
Urkiola Mendi [2]	HMX	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00	
Urko Mendi [2]	HMY	—	Cia Naviera Sota y Aznar	—	P G	—	0.30	3.00	
Valbanera [2]	ECV	300	Pinillos Izquierdo y Cia	300, 450, **600**	P G	N	0.30	3.00	

Valencia [3]	CMX	—	Cia Espanola de Nav.	—	—	—	—	—	
Valentin [3]	TKV	—	—	—	—	—	—	—	
Valmurian [3]	TKW	—	—	—	—	—	—	—	
Velarde [1]	HME	—	Don Alegandro Linate	—	P G ..	—	0.30	3.00	
Vicente Ferrer [1] ..	EEF	100	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00	
Vicente la Roda [1] ..	EER	180	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00	
Victor de Chavarri [1] ..	CMG	—	Altos Hornos de Vizcaya ..	300, 600	P G ..	X	0.30	3.00	
Villafranca [3]	TKZ	—	—	—	—	—	—	—	
Villa Manrique [3] ..	HNF	—	Gutierrez Hermanos	—	P G ..	—	0.30	3.00	
Villaodrid [3]	CXV	—	Don José Zarauz	—	P G ..	—	0.30	3.00	
Villareal [1]	EEW	180	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00	
Villa Sandino [3] ..	HNG	—	Cia Naviera Gascuna	—	P G ..	—	0.30	3.00	
V. Puchól [1]	EEP	180	Cia Trasmediterranea	300, 600	P G ..	—	0.30	3.00	
Viuda de Llusa [3] ..	TKX	—	—	—	—	—	—	—	
Viva [3]	TKY	—	—	—	—	—	—	—	
Wenceslao [3]	HNK	—	Don W. Gonzalez Garra	—	P G ..	—	0.30	3.00	
Yandiola [3]	CXY	—	Cia Nav. Guipuzcoana	—	P G ..	—	0.30	3.00	
Yute [3]	EDE	—	Cia Nav. Guipuzcoana	300, 600	P G ..	X	0.30	3.00	
SWEDEN						Greenwich Time.			
Abisko [1]..	SFL	150	Trafikaktiebolaget Grangesberg-Oxelösund	300, 450, 600	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	[1] Operated by the owners: controlled by the Soc. Anonyme Internationale de Tel. sans fil. [2] Operated and controlled by the owners [3] Operated and controlled by the Soc. Anonyme Internationale de Tel. sans fil
Aeolus SHC [2]	SHC	100	Stockholms Rederiaktiebolag Sva (Trälleborg-Sassnitz Line)	300, 600	P G ..	—	0.28	2.80	
Africanic [1]	SFS	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Anglia SIA [3]	SIA	250	Rederiaktiebolaget Svenska Lloyd	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00	
Annie Johnson [2] ..	SHH	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Aspen [1]	SHG	250	Fornyade Angf. Aktieb. Viking..	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Atland [1]..	SHY	350	Angfartygsaktiebolaget Tirfing ..	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SWEDEN—*contd.*						Greenwich Time.	Francs.	Francs.	
Atlantic [1]	SFT	250	Rederiaktiebolaget Transatlantic	300, **600**	P	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Australic [1]	SFH	250	Rederiaktiebolaget Transatlantic	300, **600**	P	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Axel Johnson [2]	SGK	350	Rederiaktiebolaget Nordstjernan	300, **600**	P	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Balboa SHX [2]	SHX	350	Rederiaktiebolaget Nordstjernan	300, **600**	P	6 to 7 a.m. 11-to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00	
Balder [2]	SGO	200	Angf. Aktieb. "Thule"	300, **600**	P G	N	0.40	4.00	
Baltic SFU [1]	SFU	250	Rederiaktiebolaget Transatlantic	300, **600**	P	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Bele [2]	SGP	200	Angf. Aktieb. "Thule"	300, **600**	P G	N	0.40	2.80	
Birger Jarl [2]	SHD	100	Stockholms Rederiaktiebolag Svea	300, **600**	P	—	0.28	2.80	
Boden [1]	SFW	150	Trafikaktiebolaget Grangesberg-Oxelösund	300, **600**	P	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	

Bolmen [1]	SHA	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Bris [2]	SHT	250	Rederiaktiebolaget Bore	300, 600	P ..	12 p.m. to 12.30 a.m. 8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 4 to 4.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Buenos Aires SIU [2] ..	SIU	350	Raderiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00
Bullaren [2]	SHN	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Carlsholm [1]	SGR	350	Svenska America-Mexico Linjen	300, 600	P G ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Catalonia [2]	SID	250	Rederiaktiebolaget Svenska Lloyd	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00
Cavalla [2]	SIK	250	Rederiaktiebolaget Sverige-Levanten	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30. p.m.	0.40	4.00
Ceylon SGY [1]	SGY	350	Swedish East Asiatic Co. ..	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Drottning Sophia [2] ..	SHK	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Drottning Viktoria [2] ..	SEB	100	State Railways (Sassnitz-Trelleborg Line)	300, 375, 600	P R, O	X	—	—
Egil [2]	SIN	100	Stockholms Rederiaktiebolag Svea	300, 600	P G ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.28	2.80
Faxen [2]	SHU	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	6 to 7 a.m. 1 to 2 p.m. 6 to 7 p.m.	0.28	2.80

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SWEDEN—*contd.*						Greenwich Time.	Francs.	Francs.	
G. D. Kennedy[1]	SGV	100	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Gustavsholm[3]	SIH	250	Aktie. Svenska Amerika-Mex. Linien	300, **600**	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
Hansa SHO[2]	SHO	150	Angfartygsaktiebolaget Gotland ..	300, **600**	P G ..	N	0.28	2.80	
Harald[2]	SIE	100	Göteborgs Bogserings Aktie. ..	300, **600**	P ..	X	0.28	2.80	
Heimdall SGH[2] ..	SGH	160	Stockholms Rederiaktiebolag Svea.	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.28	2.80	
Hellenic[1]	SEF	250	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 a.m. 11 to 12 p.m.	0.40	4.00	
Hermes SIM[2]	SIM	100	Bergnings- och Dykeri-Aktie. Neptun.	300, **600**	P ..	7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Holmia[2]	SIQ	250	Rederiaktiebolaget Svenska Lloyd	300, **600**	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00	
Indianic[1]	SFE	250	Raderiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	

Japan[1]	SGX	350	Swedish East Asiatic Co. ..	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Konung Gustaf V.[3] ..	SEA	100	State Railways (Sassnitz-Tralleborg Line)	300, 375, 600	P R, O..	X	—	—
Kratos[1].. ..	SFQ	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Kronprinsessan Margareta[3]	SFY	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Kronprinsessan Victoria[3]	SGB	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Kronprins Gustaf[3] ..	SHL	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Kronprins Gustaf Adolf[3]	SFV	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Liguria SIB[3]	SIB	250	Rederiaktiebolaget Svenska Lloyd	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00
Lima SHJ[3]	SHJ	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Magda[3]	SHS	250	Afrikanska Angfartygs Aktie. ..	300, 600	P ..	12 p.m. to 12.30 a.m. 8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 4 to 4.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Malmo[5]..	SED	100	State Railways (Malmö-Copenhagen Line)	300, 375, 600	O ..	X	—	—
Masilia[3]	SIC	250	Rederiaktiebolaget Svenska Lloyd	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00
Mertainen[3]	SIT	250	Trafikaktiebolaget Grangesberg-Oxelösund	300, 600	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SWEDEN—*contd.*						Greenwich Time.	Francs.	Francs.	
Narvik [1]	SFX	150	Trafikaktiebolaget Grangesberg-Oxelösund	300, **600**	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	
Nippon SIO [2]	SIO	350	Aktie. Svenska Ostas. Kompaniet.	300, **600**	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
Nordic [1]	SGG	250	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Oaxen V. [2]	SGN	100	Aktie. Karta & Oaxens Kalkbruk	300, **600**	P ..	X	—	—	
Odessa SII [2]	SII	250	Rederiaktiebolaget Sverige-Levanten	300, **600**	P ..	8 to 8.30 a.m. 12 a.m to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
Oscar Fredrik [2] ..	SHM	350	Rederiaktiebolaget Nordstjernan	300, **600**	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Pacific SFZ [2]	SFZ	350	Red riaktiebolaget Nordstjernan	300, **600**	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Pedro Christophersen [2]	SGE	350	Rederiaktiebolaget Nordstjernan	300, **600**	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Peking [2]	SHV	350	Aktie. Svenska Ostas Kompaniet.	300, **600**	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	

Prinsessan Ingeborg [2]	SHB	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Saga SFB [2] ..	SFB	150	Angf. Aktieb. "Thule"	300, 600	P G ..	N	0.28	2.80
Sagoland [1]	SGM	350	Angfartygsaktiebolaget Tirfing. ..	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00
San Francisco SGC [2] ..	SGC	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80
Salen [2] ..	SIR	250	Rediaktiebolaget Transatlantic ..	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Siljan [1]	SGJ	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Sir Ernest Cassel [1] ..	SFP	150	Trafikaktiebolaget Grangesberg-Oxelösund	300, 600	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00
Skagerak [2] ..	SEC	70	Government	300, 600	P ..	6.30 to 7.30 a.m. 9.30 to 11.30 a.m. 2.30 to 3.30 p.m. 4.30 to 5.30 p.m.	—	—
Skagern [1] ..	SGU	250	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00
Stockholm [2]	SGL	250	Rederiaktiebolaget Sverige Nord-Amerika	300, 600	P G ..	N	0.40	4.00
Stureholm [2]	SIL	350	Aktie. Svenska Amerika Mexiko Linien	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00
Suecia [2]	SGT	350	Rederiaktiebolaget Nordstjernan	300, 600	P G ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
SWEDEN—*contd.*						Greenwich Time.	Francs.	Francs.	
Sumatra SGD [1] ..	SGD	350	Swedish East Asiatic Co. ..	300, **600**	P G ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
Svarten [2]	SIS	250	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Sydic [1]	SGF	250	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Tasmanic [1]	SFG	250	Rederiak iebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Texas SFD [1]	SFD	200	Svenska Amerika-Mexico Linjen	300, **600**	P ..	midnight to 12.15 a.m. 4 to 4.15 a.m. 8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	
Thorsten [2]	SGQ	200	Angf. Aktieb. "Thule"	300, **600**	P G ..	N	0.40	2.80	
Thule [2]	SFC	150	Angf. Aktieb. "Thule"	300, **600**	P G ..	N	0.28	2.80	
Tisnaren [2]	SHQ	250	Rederiaktiebolaget Transatlantic	300, **600**	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	

Torne[1]	SFJ	150	Trafikaktiebolaget Grandesberg-Oxelösund	300, 450, 600	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	
Turbinia SHZ[2] ..	SHZ	250	Rederiaktiebolaget Svenska Lloyd	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.40	4.00	
Valparaiso[2]	SGW	350	Rederiaktiebolaget Nordstjernan	300, 600	P ..	6 to 7 a.m. 11 to 12 a.m. 2 to 3 p.m. 6 to 7 p.m.	0.28	2.80	
Varna[2]	SIJ	250	Rederiaktiebolaget Sverige-Levanten	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
Vinga[2]	SIF	150	Rederiaktiebolaget Transatlantic	300, 600	P ..	3 to 4 a.m. 7 to 8 a.m. 11 to 12 a.m. 3 to 4 p.m. 7 to 8 p.m. 11 to 12 p.m.	0.40	4.00	
Vollrath Tham[1] ..	SFO	150	Trafikaktiebolaget Grangesberg-Oxelösund	300, 600	P ..	8 to 8.15 a.m. 12 a.m. to 12.15 p.m. 4 to 4.15 p.m. 8 to 8.15 p.m.	0.40	4.00	
Yeddo[1]	SHF	350	Swedish East Asiatic Co. ..	300, 600	P ..	8 to 8.30 a.m. 12 a.m. to 12.30 p.m. 8 to 8.30 p.m.	0.40	4.00	
UNITED STATES OF AMERICA									
Abangarez[3]	KDI	—	United Fruit Co. ..	300, 600	P G ..	—	—	—	[1] Operated and controlled by the United States Navy
Abbeville[1]	KLN	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	[2] Operated and controlled by the Radio Corporation of America
Aberdeen[1]	WXIU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	[3] Operated and controlled by the owners
Ablanset[1]	KIXF	—	U.S. Shipping Board	—	P G ..	X	0.20	—	[4] Operated and controlled by the Ship Owners' Radio Service (Kilbourne and Clark)
Abner Coburn[4] ..	WHR	—	Libby, McNeill & Libby	300, 450, 600	P G ..	—	—	—	[5] Operated and controlled by the Independent Wireless Tel. Co.
Abraham Lincoln[4] ..	KIXS	—	U.S. Shipping Board	—	P G ..	X	0.20	—	[6] Operated and controlled by the Federal Telegraph Co.
Abrigada[1]	KNIE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Abron[1]	KEBD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Absaroka[1]	WKW	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Absecon[1]	KSEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
A. C. Bedford[2] ..	KNZ	—	Standard Oil Co. of New Jersey ..	300, 450, 600	P G ..	X	0.20	—	
Achilles[3]	KPT	—	Panama Railroad Co.	300, 450, 600	P G ..	—	—	—	
Acme[2]	KIJ	—	Standard Transportation Co. ..	300, 600	P G ..	X	0.20	—	
Acrema[1]	KEDD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Aculeo[1]	KEQQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Addison[1]	WBAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Admiral Dewey[4] ..	WAY	—	Pacific S.S. Co.	300, 600	P G ..	—	—	—	
Admiral Evans[4] ..	KICZ	—	Pacific S.S. Co.	300, 600	P G ..	—	—	—	
Admiral Farragut[4] ..	WAF	—	Pacific S.S. Co.	300, 450, 600	P G ..	—	—	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Admiral Goodrich [4]	WRJ	—	Pacific S.S. Co.	300, 440, **600**	P G	—	—	—	[7] Ship tax applicable when engaged on North and South American service [8] Ship tax applicable when engaged on Trans-oceanic service [9] Controlled by Gray and Danielson Mfg. Co.
Admiral Mayo [9]	WZIO	—	Pacific S.S. Co.	300, 440, **600**	P G	—	—	—	
Admiral Nicholson [4]	KMAA	—	Pacific S.S. Co.	300, 450, **600**	P G	—	—	—	
Admiral Rodman [9]	WOA	—	Pacific S.S. Co.	300, **600**	P G	—	—	—	
Admiral Schley [4]	WAZ	—	Pacific S.S. Co.	300, **600**	P G	—	—	—	
Admiral Sebree [4]	WAG	—	Pacific Alaska Nav. Co.	300, **600**	P G	—	—	—	
Admiral Sims [9]	KXUO	—	Pacific Alaska Nav. Co.	300, 440, **600**	P G	—	—	—	
Admiral Wainwright [4]	WSF	—	Pacific S.S. Co.	300, 450, **600**	P G	—	—	—	
Admiral Watson [4]	WAW	—	Pacific S.S. Co.	300, 450, **600**	P G	—	—	—	
Advance [8]	KMV	—	Panama Railroad Co.	300, 450, **600**	P G	—	—	—	
Adway [8]	WBEA	—	U.S. Shipping Board	300, **600**	P G	—	—	—	
Afalkey [1]	WBEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Afel [1]	KISQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Afoundria [1]	KOMG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Afrania [1]	KLAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Agarista [1]	KLUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Agawam [1]	WNIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Agria [1]	WQAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Agwidale [5]	WDOA	—	Mallory S.S. Co.	300, **600**	P G	X	0.20	—	
Agwistar [5]	KEPG	—	Mallory S.S. Co.	300, **600**	P G	X	0.20	—	
Ahala [1]	KECZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aiken [1]	WMUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aimwell [1]	WVUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Airlie [3]	WBEI	—	Nacirema S.S. Co.	300, **600**	P G	X	0.20	—	
Ajax [8]	KOJ	—	A. Fabbri	300, **600**	—	—	—	—	
Alabama [3]	WFB	—	Goodrich Transit Co.	300, **600**	P G	X	0.20	—	
Alabama [5]	WRAE	—	The Texas Co.	300, **600**	P G	—	—	—	
Alabat [1]	WSAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Alameda WAA [4]	WAA	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Alameda KOBN [1]	KOBN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Alamo [1]	KEJ	—	Mallory S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Alamosa [1]	WLUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Alanthus [1]	WVEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Alapaha [1]	WZAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Alaska [4]	WWS	—	Alaska S.S. Co.	300, 435, **600**	P G	—	—	—	
Alaskan [8]	WKA	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—	
Albatross [9]	KELD	—	The Albatross Co.	300, **600**	P G	—	—	—	

Ship	Call		Owner	Wave lengths	System	Service	Rate	
Alberta [3]	KZA	—	F. G. Bourne	300, 600	P G	—	—	—
Alcis [1]	KEPX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alcona [1]	WLUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alderman [1]	KIFF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alector [1]	KEPZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Aledo [1]	KEPL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alicia [3]	KZB	—	A.I. du Pont	300, 600	P G	—	—	—
Algonquin [3]	KIZT	—	Clyde S.S. Co.	300, 600	P G	X	0.20	—
Allaguash [4]	KVX	—	American Transport Co.	300, 450, 600	P G	—	—	—
Allegheny [3]	WRAI	—	Gr. Lakes Transport Co.	300, 600	P G	—	—	—
Allenhurst [1]	WNOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Allentown [1]	KVIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Allianca [1]	KMA	—	Panama Railroad Co.	300, 450, 600	P G	X	0.20	—
Alliance [3]	WRV	—	Gulf Mail S.S. Co.	300, 600	P G	X	0.20	—
Allies [1]	KQUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Allison [1]	WTOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alloway [1]	KTAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Aloha [3]	KYH	—	A. C. James	300, 450, 600	P G	—	—	—
Alpaco [1]	WBII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alpena [3]	WCS	—	Wyandotte Trans. Co.	300, 600	P G	X	0.20	—
Alta [1]	KICX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Alvada [1]	WGEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Amabala [1]	WRAE	—	The Texas Co.	300, 600	P G	X	0.20	—
Amazonia [1]	KOO	—	Smith Navigation Co.	300, 450, 600	P G	X	0.20	—
Ambridge [1]	KIKQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
A. M. Byers [2]	WMY	—	North American S.S. Co.	300, 600	P G	X	0.20	—
Amcross [1]	KOVF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Amelia [3]	WRF	—	Atlantic Fruit Co.	300, 600	P G	X	0.20	—
American [3]	WKF	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
American Star [1]	KIPP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Amoleo [3]	KMB	—	Boston Molasses Co.	300, 450, 600	P G	—	—	—
Amoron [1]	WTOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ampetco [2]	KMAU	—	Standard Oil Co.	300, 450, 600	P G	X	0.20	—
Amphion [1]	WJS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Anaconda [4]	KOFD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Anacortes [1]	KQOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ancon [3]	KMS	—	Panama Railroad Co.	300, 400, 600	P G	—	—	—
Andalusia [1]	WJA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Andra [1]	WDEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Andrea F. Luckenbach [5]	KIFV	—	Luckenbach S.S. Co.	300, 600	P G	X	0.20	—
Andrew Jackson [1]	KONQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Angelina [1]	KIFT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Aniwa [1]	KROE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Anna [1]	WJD	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Ann Arbor No. 3 [3]	WDN	—	Ann Arbor Railroad Co.	300, 600	P G	X	0.20	—
Ann Arbor No. 4 [3]	WDO	—	Ann Arbor Railroad Co.	300, 600	P G	X	0.20	—
Ann Arbor No. 5 [3]	WDP	—	Empire Trust Co.	300, 600	P G	X	0.20	—
Ann Arbor No. 6 [3]	WDQ	—	Ann Arbor Railroad Co.	300, 600	P G	X	0.20	—
Anneta [2]	WRG	—	Atlantic Fruit Co.	300, 600	P G	X	0.20	—
Annette Rolph [3]	KETZ	—	Rolph Nav. & Coal Co.	300, 600	P G	—	—	—
Anniston [1]	KIDM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Anoka [1]	KQEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Anthera [1]	WNUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Antietan [2]	KONR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Antigone [1]	KOKN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Antilla [5]	KWD	—	N.Y. & C.M. S.S. Co.	300, 450, **600**	P G	—	—	—	
Antonia [3]	KOLD	—	Madrigal & Co.	—	—	—	—	—	
Anyox [4]	WCJ	—	C.S.S. & B. Co.	300, **600**	P G	—	—	—	
Aowa [1]	WRIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Apache KVA [3]	KVA	—	Clyde S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Apache KYY [3]	KYY	—	R. F. Herrick	300, **600**	P G	—	—	—	
Apalachee [1]	WSAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Apex [1]	KGUI	—	Wilson Fish Co.	300, 575, **600**	P G	X	0.20	—	
Appeles [1]	WMV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aquackanock [1]	KSAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aquilo [1]	KOCJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arado [1]	WVUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arakan [5]	KCEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arambi [1]	KESF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aramis [3]	WDZ	—	A. H. Marks	300, 450, **600**	P G	—	—	—	
Arapahoe [3]	KVB	—	Clyde S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Arcadia [1]	WWD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Archer [1]	KXG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ardena [1]	KBEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ardmore [2]	KIA	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Arenas [1]	KIRM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Argenta [3]	KIKS	—	Nacirema S.S. Corp.	300, **600**	P G	X	0.20	—	
Argonne [3]	KSIO	—	Argonne S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Argyll [4]	WTB	—	Union Oil Co., California	300, **600**	P G	—	—	—	
Arizona [3]	WFG	—	Goodrich Transit Co.	300, **600**	P G	X	0.20	—	
Arizonan [9]	WKB	—	American-Hawaiian S.S.Co.	300, **600**	P G	—	—	—	
Arlington [2]	KZY	—	N.E.F. & Tr. Co.	300, **600**	P G	—	—	—	
Armenia [1]	KYM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Artemis [1]	WOS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Artigas [1]	KVOA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Artisan [1]	KBOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arundel [1]	KETQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arundo [1]	KCRE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Arvonia [1]	WMOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Aryan [5]	KOLB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Asabeth [1]	KDKG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Ascutney[1]	KYV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ashbee[1]	KIGZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ashburn[1]	WBEO	—	Nacirema S.S. Corp.	300, 600	P G ..	X	0.20	—
Ashland County[1] ..	KOMR	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ashtabula[2]	WEZ	—	P. & O. Nav. Co.	300, 600	P G ..	X	0.20	—
Askawake[1]	KETM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Asotin[1]	KILD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Aspenhill[1]	KETR	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Asquain[1]	KISV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Assinippi[1]	KIPB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Astoria KRIE[1] ..	KRIE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Astoria WRL[8]	WRL	—	Vik. Shipping Co.	300, 450, 600	P G ..	—	—	—
Astral[2]	KIQ	—	Standard Transportation Co. ..	300, 450, 600	P G ..	—	—	—
Asuncion[2]	WTX	—	Standard Oil Co., California ..	300, 600	P G ..	X	0.20	—
Atenas[3]	KDK	—	United Fruit Co.	300, 600	P G ..	—	—	—
Atlantus[5]	KIGN	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Atlas[2]	WTT	—	Standard Oil Co., California ..	300, 450, 600	P G ..	X	0.20	—
Auburn[1]	WDOE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Auditor[4]	KOFF	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Augusta[2]	KMO	—	W.I.S. Corp.	300, 600	P G ..	X	0.20	—
Aurora[1]	WJAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ausable[4]	WWP	—	American Transport Co.	300, 600	P G ..	—	—	—
Avalon[3]	KIZL	—	Hartwood Lumber Co.	300, 600	P G ..	X	—	—
Avondale[1]	KKAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Awensdaw[1]	KEMC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Aztec[2]	KZC	—	A. C. Burrage	300, 600	P G ..	X	0.20	—
Babboosic[1]	KITC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Babinda[1]	KODP	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bacoi[2]	KJU	—	Standard Oil Co. of New Jersey ..	300, 450, 600	P G ..	—	—	—
Baganito[1]	KGB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bagoso[1]	WSAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bakersfield[1]	KIZC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balabac[1]	KEGD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Baladan[1]	KVEU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balboa[2]	WHU	—	Columbian Maritime Co.	300 600	P G ..	X	0.20	—
Balcatta[1]	KOLM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Baldbutte[1]	KISM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Baldhill[1]	KOBV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Baldridge[1]	KEQG	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Baldrock[1]	KEQJ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balino[1]	WKUO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ballcamp[1]	KENV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balliett[1]	KVIA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balosaro[1]	KEDB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balsam[1]	KIJC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Balsto[1]	WPAA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Banago[1]	WVEO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Banaran[1]	KENZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bancroft[1]	KNOI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bannack[1]	KIZQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bantu[2]	KLM	—	United States Steel Products Co.	300, 600	P G ..	X	0.20	—
Barobos[1]	KPUU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Bar Harbor[1]	KEFD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Barkhampstead[1] ..	WLOU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Barlow[1]	WLAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barrallton[1]	KIDT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barranca[1]	KIFR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barrenfark[1]	KIJD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barrington[1]	KJIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barryton[1]	KIJF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barstow[1]	KIJR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bartholomew[1]	KOMF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barthney[1]	KIZD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bartolome[1]	KOBS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Barwick[1]	KOBR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Basaan[1]	WRAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Basco[1]	WVEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bascobel[1]	KOFS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Basford[1]	KOFR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Basswood[1]	KOQL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bastrop[1]	KOQM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Batanes[1]	KEKX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bathalum[1]	KIQT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bathgate[1]	KIQS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Baton Rouge[2]	KSG	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Battahatchee[1]	WCOA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Battonville[5]	KIGV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bavington[1]	KOPC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Baxley[1]	WBIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bayamo[5]	WDEU	—	New York & Cuba Mail S.S. Co.	300, **600**	P G	—	—	—	
Bay Head[1]	KINT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bayou Teche[1]	WXUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bayway[3]	KSR	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Beatrice[5]	KLJ	—	A. H. Bull S.S. Co.	300, **600**	P G	—	—	—	
Beaumont[1]	WXUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bedminster[1]	WOIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Belair[1]	WTOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Belamquan[1]	WPEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Belding[1]	KPUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Belfast[5]	KRD	—	E.S.S. Lines (Inc.)	300, **600**	P G	X	0.20	—	
Belfort[1]	KIQB	—	U.S. [illegible] Board	300, **600**	P G	X	0.20	—	

Belgrade[1]	WROU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bell Brook[1]	KQEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellbuckle[1]	KITK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellemina[1]	KODS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellepline[1]	KOKF		U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellerose[1]	KOKD		U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellflower[1]	KOPQ	—	U.S. Shipping Board	300, 600	P G	N	0.20	—
Bellhaven[4]	KOFC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellingham[1]	WCIA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bellota[1]	KVEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Beloit[1]	KNIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Belvedere[3]	KVU	—	Hibbard Stewart Co.	300, 600	P G	—	—	—
Belvidere[1]	KEQK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Benjamin Brewster[3]	KPS	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Benj. F. Packard[4]	WLA	—	Booth Fisheries Co.	300, 450, 600	P G	—	—	—
Bennoni[1]	KERR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Benowa[1]	KOTZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bensalem[1]	KOFT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Benzonia[1]	KPUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Berea[1]	KELJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Berela[1]	KEKF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Berlin[3]	WRB	—	Alaska Portland Packers Assoc.	300, 450, 600	P G	X	0.20	—
Berwyn[1]	WLIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bessemer[1]	KIGT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bethelridge[1]	KERT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bethlehem Bridge[1]	KIJV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bethnor[1]	KOKT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Betsy Bell[1]	KITM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Biloxi[1]	KPAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Biran[1]	KKOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Birchleaf[3]	KEMD	—	Nacirema S.S. Corp.	300, 600	P G	X	0.20	—
Bird City[1]	KOBP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Black Arrow[1]	NAKJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Blair[1]	KIGR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Blakeley[1]	WNUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Blandon[1]	KPAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bloomington[1]	WFIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Blue Eagle[1]	KPOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bluffton[1]	KEKZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Blythedale[1]	KROA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bobring[1]	WCAA	—	Pacific American Fisheries Corp.	300, 600	P G	X	0.20	—
Bockonoff[1]	WNUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Boilston[1]	KPEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bolikow[1]	KEQD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bologan[1]	WLIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bonham[1]	WKIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bonifay[1]	KPOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bonita[3]	KFT	—	T. A. Scott & Co.	300, 600	P G	—	—	—
Bonnafon[1]	KNOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bonneteere[1]	KETL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Bon Secour[1]	KIKV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Boone[1]	KENL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Boonsborough[1]	KELL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Borad[1]	KIDK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Boreta [1]	WXUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Borges [1]	WKEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Borinquen [2]	KFV	—	Battery S.S. Corporation	300, **600**	P G	—	—	—	
Boston KXA [3]	KXA	—	New England S.S. Co.	300, **600**	P G	—	—	—	
Boston KXS [1]	KXS	—	U.S. Shipping Board	300, 476, **600**	P G	X	0.20	—	
Boston Bridge [1]	KINS	—	U.S Shipping Board	300, **600**	P G	X	0.20	—	
Bosworth [1]	KQOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Botsford [1]	WZAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bottineau [1]	WCAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Boulton [1]	KNOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bound Brook [1]	KIFQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Boureville [1]	KTEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bowesmont [1]	KTIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Boxbutte [1]	KETS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Boxley [1]	KNUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Boykin [1]	KETT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brabant [5]	KUU	—	The Texas Co.	300, 450, **600**	P G	—	—	—	
Braddock [1]	KETG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bradford [3]	KNG	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Braeburn [1]	WMOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Bramell Point [2]	KRO	—	Vacuum Oil Co.	300, 450, **600**	P G	—	—	—	
Brandon [2]	KZZ	—	N. E. F. & Tr. Co.	300, **600**	P G	—	—	—	
Brandywine [1]	WGUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brashear [1]	KIJX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brave Cœur [2]	KOGN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Braxton [1]	KIBS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brazos [3]	KEZ	—	N.Y. & P.R. S.S. Co.	300, 450, **600**	P G	—	—	—	
Bremerton [1]	WSZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brentwood [1]	KIBV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brevard [1]	KEPJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Briarcliff [1]	KEPK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Brilliant [3]	KTI	—	Standard Oil Co. of New York	300, 450, **600**	P G	—	—	—	
Brindilla [2]	KTZ	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Bristol [3]	KEGC	—	Coastwise Transit Co	300, **600**	P G	X	0.20	—	
Broad Arrow [2]	KSY	—	Standard Transportation Co.	300, 450, **600**	P G	—	—	—	
Brockton [3]	KNH	—	Colonial Nav. Co.	300, **600**	P G	—	—	—	
Bromela [1]	KRAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Brompton[1]	KRAO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Broncho[1]	KRAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookdale[1]	WNUO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookfield[1]	WNUU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookhaven[1]	WPUA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookland[1]	KEVQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookside[1]	KEZS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brookwood[2]	KRUE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Brynhilda[3]	KIO	—	Cosmopolitan Shipping Co. ..	300, 450, 600	P G ..	X	0.20	—	
Buccaneer[4]	KFO	—	Freeport & Tampico Fuel Oil & Transportation Corporation	300, 600	P G ..	X	0.20	—	
Buckhannon[5]	KELG	—	Robinson Shipping Co.	300, 600	P G ..	X	0.20	—	
Buckhorn[1]	WXIO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Buffalo Bridge[1] ..	KIZF	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Bugaya[1]	WQOU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Buhisan[1]	WVII	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Bulana[1]	WJUU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Burmont[1]	WZIE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Burnham[1]	WZII	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Burnside[1]	WGII	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Burnwell[1]	KIMS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Burnwood[1]	KEPC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Bushong[1]	KJB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Bushrod[4]	KICB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Butte[1]	KICC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Buttercup[1]	KIJT	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Butterfield[1]	KIJS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Buttonwood[1]	KLB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Byfield[1]	KIBZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Bylayl[3]	KSOU	—	Poch. Fuel Co.	300, 600	P G ..	—	—	—	
Cabegon[1]	KEJQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cabeza[1]	KKEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cabrille[1]	KENS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cabrillo[3]	WBV	—	Wilmington Transportation Co.	300, 600	P G ..	X	0.20	—	
Cabura[1]	KQAA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
C. A. Canfield[3] ..	WIH	—	P.A.P. & T. Co.	300, 450, 600	P G ..	—	—	—	
Cacique[3]	WBE	—	W. R. Grace & Co.	300, 600	P G ..	—	—	—	
Cadaretta[1]	WLOO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Caddo[3]	KSK	—	Standard Oil Co. of New Jersey ..	300, 450, 600	P G ..	—	—	—	
Caddopeak[1]	WPUE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Calala[1]	KQAO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Calamares[3]	KLC	—	United Fruit Co.	300, 600	P G ..	—	—	—	
Calaveras[1]	KXIE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Calicorock[1]	KXII	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
California[3]	KYQ	—	Mrs. C. B. Stocker	300, 600	P G ..	—	—	—	
Calispell[1]	KXIO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Callabasas[1]	WPUI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Callao WHF[3]	WHF	—	Bark Callao Corp.	300, 600	P G ..	—	—	—	
Callao KEQS[1] ..	KEQS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Callooh[1]	KPEE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Calno[1]	KINV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Caloria[3]	KSP	—	Standard Oil Co. of New Jersey ..	300, 600	P G ..	—	—	—	
Caluseus[1]	KOQB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Calvert[1]	WTUI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge.		Notes.
							Per Word.	Minimum per Radio-telegram.	
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Calvin Austin [3]	KRN	—	Eastern S.S. Lines (Inc.)	300, **600**	P G	—	—	—	
Camaquey [5]	KWI	—	New York & Cuba Mail S.S. Co.	300, 450, **600**	P G	—	—	—	
Cambridge KGR [3]	KGR	—	New York & New Orleans S.S. Co.	300, 550, **600**	P G	—	—	—	
Cambridge KIRR [1]	KIRR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Camden [3]	KRC	—	Eastern S.S. Lines (Inc.)	300, **600**	P G	X	0.20	—	
Campello [5]	WTAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Canaveral [1]	WTEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Canibas [1]	WQEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Canoga [1]	WKZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cansumset [1]	KIQD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cape Cod [3]	KPW	—	Whitehall Trans. Co.	300, **600**	P G	X	0.20	—	
Cape Henry [1]	KMIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cape May [1]	WDOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cape Romain [1]	KREA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Capines [1]	KSAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Caponka [1]	WCAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Capt. A. F. Lucas [3]	WTV	—	Standard Oil Co. of California	300, 450, **600**	P G	X	0.20	—	
Caracas [3]	KDB	—	A. & C.S.N. Co.	300, 450, **600**	P G	X	0.20	—	
Carib KJIU [3]	KJIU	—	A.G. & W.I.S.S. Lines	300, **600**	P G	—	—	—	
Carib KMIA [3]	KMIA	—	Carib S.S. Co.	300, **600**	P G	X	0.20	—	
Caribbean [3]	KGUE	—	Panama Railroad Co	300, **600**	P G	—	—	—	
Caribou [1]	WSIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Carl. D. Bradley [3]	WGN	—	Bradley Transport Co.	300, **600**	P G	X	0.20	—	
Carolina [3]	WFE	—	Goodrich Transit Co.	300, **600**	P G	X	0.20	—	
Carolinian [3]	KJF	—	Garland S.S. Corporation	300, **600**	P G	—	—	—	
Carolyn [3]	KZG	—	A. H. Bull S.S. Co.	300, **600**	P G	—	—	—	
Carrillo [3]	KDE	—	United Fruit Co.	300, **600**	P G	—	—	—	
Cartago [3]	KDD	—	United Fruit Co.	300, **600**	P G	—	—	—	
Cascade [1]	WPUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Casco [1]	WCP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Casey [5]	KOOJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Casiana [3]	KYE	—	E. L. Doheny	300, **600**	P G	X	0.20	—	
Casmalia [1]	WSII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
C. A. Smith [3]	WEL	—	C. A. Smith Lbr. Co.	300, **600**	P G	—	—	—	
Casper [1]	KIRX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Castle Point [1]	KRSD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Castle Town [1]	KOF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Castle Wood[1]	KEKQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Catania[2]	WTI	—	P. A. Petro. Co.	300, 450, 600	P G	X	0.20	—
Catawba[1]	KVEE	—	U. S. Shipping Board	300, 600	P G	X	0.20	—
Catherine D[4]	KMAI	—	P.A. Fisheries	300, 450, 600	P G	—	—	—
Cathlamet[5]	KOLP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cauto[5]	KWF	—	Atlantic Gulf & W. Indies Line	300, 450, 600	P G	—	—	—
Cawker[1]	KECF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cedar Spring[1]	WTEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Celilo[3]	WMF	—	Celilo S.S. Co.	300, 600	P G	X	0.20	—
Centaurus[1]	KOPZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Central American[2]	WKOU	—	The Texas Co.	300, 600	P G	—	—	—
Centralia[2]	WSN	—	Gulf Mail S.S. Co.	300, 600	P G	X	0.20	—
Ceralvo[1]	WTEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ceresco[1]	WTEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cerrito[1]	WFIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cerro Gardo	KEFK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cethana[1]	KORG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Challamba[1]	KORJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Challenger[1]	WNII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chalmette[3]	KKC	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
Chamberino[1]	KEFL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chamblee[1]	KEGG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Champion[5]	KIXV	—	Atlantic Transport Co.	300, 600	P G	X	0.20	—
Chancook[1]	KOFJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chantier[1]	KEGK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chaparel[1]	KEGJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chappell[1]	KEVS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Charles Braley[3]	KVP	—	A.I.C.C.	300, 450, 600	P G	—	—	—
Charles E. Harwood[2]	WID	—	P.A.P. & T. Co.	300, 450, 600	P G	—	—	—
Charles M. Everest[3]	WPOU	—	Vacuum Oil Co.	300, 600	F G	—	—	—
Charles O. Jenkins[2]	WFT	—	Jenkins S.S. Co.	300, 450, 600	P G	X	0.20	—
Charles Pratt[2]	KSQ	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Charles R. Van Hise[1]	WFUI	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Charlot[1]	WMUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Charlton Hall[2]	KLU	—	United States Steel Products Co.	300, 600	P G	X	0.20	—
Chattanooga[1]	KIDN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chautauqua[1]	KIFK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chebaulip[1]	KJAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chelan[1]	WCAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chepadoa[1]	KOFL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Cherokee[3]	KVK	—	Clyde S.S. Co.	300, 450, 600	P G	—	—	—
Cheron[1]	KNII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chester Sun[2]	WAS	—	The Sun Co.	300, 600	P G	—	—	—
Chester Valley[1]	KOST	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chester W. Chaplin[3]	KXQ	—	New England S.S. Co.	300, 550, 600	P G	—	—	—
Chestnut Hill[1]	KVG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chetopa[1]	KCAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chibiabos[1]	WPOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chicago[4]	WAC	—	Booth Fisheries Co.	300, 600	P G	—	—	—
Chicago Bridge[1]	KECG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chickasaw[1]	KOJR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chicomico[2]	KOLS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Chimo[1]	KKOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
China[2]	WWA	—	China Mail S.S. Co.	300, 450, 600	P G	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Chinampa [2]	KSC	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Chincha [1]	KJZ	—	Green Star S.S. Corp.	300, 450, **600**	P G	X	0.20	—	
Chipchung [1]	WBIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Christopher Columbus [2]	WFJ	—	Goodrich Transit Co.	300, **600**	P G	X	0.20	—	
Cineas [1]	KEXP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Circinus [1]	KOPK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Alpena II [2]	WEH	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	—	—	—	
City of Alton [1]	KONZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Atlanta [3]	KFB	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Augusta [3]	KFJ	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Bangor [2]	KRH	—	Eastern S.S. Lines	300, **600**	P G	X	0.20	—	
City of Benton Harbor [3]	WDV	—	Graham & Morton Trans. Co.	300, **600**	P G	X	0.20	—	
City of Brockton [3]	KXO	—	New England S.S. Co.	300, **600**	P G	—	—	—	
City of Buffalo [2]	WFQ	—	Cleveland & Buffalo Transit Co.	300, **600**	P G	X	0.20	—	
City of Cleveland II [2]	WEA	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	X	0.20	—	
City of Columbus [3]	KFA	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Detroit II [2]	WEC	—	Detroit & Cleveland Nav. Co.	300, 450, **600**	P G	—	—	—	
City of Detroit III [2]	WEF	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	X	0.20	—	
City of Erie [3]	WFP	—	Cleveland & Buffalo Transit Co.	300, **600**	P G	X	0.20	—	
City of Eureka [1]	KEFT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Everett [5]	KTQ	—	Standard Oil Co. of N. York	300, **600**	P G	—	—	—	
City of Fairbury [1]	KISR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Freeport [1]	KESV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Grand Rapids [3]	WDS	—	Graham & Morton Trans. Co.	300, **600**	P G	X	0.20	—	
City of Lowell [3]	KXB	—	New England S.S. Co.	300, 550, **600**	P G	—	—	—	
City of Mackinac II [2]	WEB	—	Detroit and Cleveland Nav. Co.	300, **600**	P G	—	—	—	
City of Montgomery [3]	KFY	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Para [6]	WWF	—	Pacific Mail S.S. Co.	300, **600**	P G	—	—	—	
City of Puebla [5]	WGQ	—	City of Puebla Corp.	300, **600**	P G	X	0.20	—	
City of Rockland [2]	KRI	—	Eastern S.S. Lines	300, **600**	P G	X	0.20	—	
City of Rome [3]	KQZ	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of St. Ignace [2]	WEG	—	Detroit & Cleveland Nav. Co.	300, **600**	P G	—	—	—	
City of St. Joseph [3]	KOSM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of St. Louis [3]	KFX	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Savannah [3]	KFK	—	Ocean S.S. Co.	300, 450, **600**	P G	—	—	—	
City of Spokane [1]	KILL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
City of Seattle [3]	WGA	—	Pacific S.S. Co.	300, **600**	P G	X	0.20	—	

City of Sydney [3] ..	KKEI	—	L. A. Petersen	300, 600	P G ..	—	—		
City of Taunton [3] ..	KXL	—	New England S.S. Co.	300, 550, 600	P G ..	—	—		
City of Topeka [3] ..	WGY	—	Pacific S.S. Co.	300, 600	P G ..	X	0.20		
Clackamas [1]	KQEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20		
Clairton [1] ..	KIKR	—	U.S. Shipping Board	300, 600	P G ..	X	0.20		
Clara [1]	WJH	—	U.S. Shipping Board	300, 450, 600	P G ..	X	0.20	—	
Clare [3]	KNE	—	A. H. Bull S.S. Co.	300, 600	P G ..	—	—		
Clark Mills [1]	KOCQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Clavarack [2]	KOLL	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Clemens A. Reiss [2] ..	WNH	—	Reiss S.S. Co.	300, 600	P G ..	X	0.20	—	
Cleopatra [1]	KIQL	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cletus Schneider [3] ..	KMEO	—	Paisley S.S. Co.	300, 600	P G ..	—	—	—	
Cliffwood [1]	KORX	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Clincho [1]	KENX	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Clio KIKZ [1]	KIKZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Clodia [1]	KILB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Coahoma County [1] ..	KOMP	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Coalinga [6]	WOT	—	Union S.S. Co.	300, 600	P G ..	—	—	—	
Coamo [3]	KGA	—	New York & Porto Rico S.S. Co..	300, 450, 600	P G ..	—	—	—	
Coastwise [3]	KUZ	—	Neptune Line (Inc.)	300, 600	P G ..	X	0.20	—	
Coaxet [1]	WPUU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cochin [1]	KELR	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cockaponset [1]	KOFN	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Coconino [1]	WMIA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cocopa [1]	WXAI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cohasset [1]	WJUI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cokato [1]	WMUE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cokesit [1]	WQUA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Coldbrook [5]	KOQK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Cold Spring [2]	KIQK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Colindo [5]	KSUI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Coloma [1]	KNIU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Colombia [5]	WBH	—	Pacific Mail S.S. Co.	300, 600	P G ..	—	—	—	
Colon [3]	KMX	—	Panama Railroad Co.	300, 450, 600	P G ..	—	—	—	
Colorado Springs [1] ..	KILK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Col. E. L. Drake [2] ..	WTS	—	Standard Oil Co. of California ..	300, 450, 600	P G ..	X	0.20	—	
Columbia [1]	WHC	—	New Orleans & S. American S.S. Co.	300, 600	P G ..	X	0.20	—	
Columbine [1]	WLOI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Colusa [2]	WIN	—	Grace S.S. Co.	300, 600	P G ..	—	—	—	
Comal [5]	KEM	—	Mallory S.S. Co.	300, 450, 600	P G ..	—	—	—	
Comanche [3]	KVC	—	Clyde S.S. Co.	300, 600	P G ..	X	0.20	—	
Comet [2]	KTJ	—	Standard Oil Co. of New Jersey	300, 450, 600	P G ..	—	—	—	
Commissionier [4] ..	KOGZ	—	Merritt & Chapman Derrick & Wrecking Co.	300, 600	P G ..	X	0.20	—	
Commonwealth [3] ..	KXC	—	New England S.S. Co.	300, 550, 600	P G ..	—	—	—	
Communipaw [2]	KOE	—	Standard Oil Co. of New Jersey..	300, 600	P G ..	—	—	—	
Comus [3]	KKD	—	Southern Pacific Co.	300, 450, 600	P G ..	—	—	—	
Concho [5]	KEC	—	Mallory S.S. Co.	300, 450, 600	P G ..	—	—	—	
Concord [3]	KNC	—	Colonial Navigation Co. ..	300, 550, 600	P G ..	—	—	—	
Congaree [1]	WVEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Conneaut [2]	WCU	—	Gulf Ref. Co.	300, 600	P G ..	X	0.20	—	
Connersville [1]	WKOO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Conotton [1]	WVAO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	
Consort [1]	KDOI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radiotelegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Contoocook [1]	WVAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cook [1]	KOFX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coolcha [1]	KOPS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coosa [1]	WLF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Copalgrove [1]	KEFJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coperas [1]	WTEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coppename [3]	KDF	—	United Fruit Co.	300, **600**	P G	—	—	—	
Coquina [1]	WVAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coquitt [5]	KOFZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cora T. Cressy [2]	KSZ	—	F.C. S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Coral [1]	KIMF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corapeak [1]	WVAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corcoran [1]	WVAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cordova [4]	WAR	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Cornelia [5]	KZD	—	A. H. Bull S.S. Co.	300, **600**	P G	—	—	—	
Corning [3]	KIH	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Cornucopia [1]	WNIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coronado [1]	WFZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corozal [2]	KQIA	—	N.Y. & P.R. S.S. Co.	300, **600**	P G	X	0.20	—	
Corrales [1]	WPIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corsair [2]	KYC	—	J. P. M rgan	300, **600**	P G	X	0.20	—	
Corsicana [1]	WPII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corson [1]	KIQV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corvallis [1]	KIBT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Corvus [1]	KOPL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coskata [1]	KOMZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Costa Rica [2]	WQI	—	L. A. Pedersen	300, **600**	P G	—	—	—	
Costigan [1]	KINF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Costilla [1]	WMEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cotati [1]	KIQF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cote Blanche [4]	WMEB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cotopaxi [1]	WMEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cotteral [1]	WCEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cottonplant [1]	WMEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Cottonwood [1]	WMEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Coulee [1]	WTOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Coulter[1]	WQAO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Council Bluffs[1] ..	WVOA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Couparle[1]	WVOE	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Courageous[1]	WVUA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Courtois[1]	WVOI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Coushatta[1]	WVOO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Coutolene[1]	WVOU	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Covalt[1]	KEMM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Covedale[1]	KEMN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Covena[1]	KEMP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Coverun[1]	KENM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowan[1]	KENN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowanshannock[1] ..	WMAE	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowardin[1]	KESL	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowboy[1]	WMAI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowee[1]	WMAO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Coweta[1]	WNEU	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cowiche[1]	WXOA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Coyote[1]	KXUU	—	American S.S. Corp. ..	300, **600**	P G ..	X	0.20	—
Crabtree[1]	WXOE	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Craftsman[1]	KIBR	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Craigrowine[1]	WXOI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Craigsmere[1]	WXOO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Craincreek[1]	WNAA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cranenest[1]	WNAE	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cranford[1]	KOLX	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Crasterhall[2]	KLK	—	United States Steel Products Co.	300, **600**	P G ..	—	—	—
Crathorne[1]	WSOO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Crawl Keys[1]	WDEI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Craycroft[1]	WNAI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Creole[3]	KKR	—	Southern Pacific Co.	300, **600**	P G ..	—	—	—
Cresap[1]	KRUA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cretan[2]	KQC	—	M. & M. Trans. Co.	300, 450, **600**	P G ..	—	—	—
Cricket[4]	WSEI	—	Cricket S.S. Co.	300, 450, **600**	P G ..	—	—	—
Cripple Creek[4]	KOJL	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Crisfield[5]	KOKP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cristobal[3]	KMD	—	Panama Railroad Co.	300, 450, **600**	P G ..	—	—	—
Crofton Hall[2]	KLR	—	United States Steel Products Co.	300, 450, **600**	P G ..	X	0.20	—
Cross Keys[3]	KOTD	—	Teal Co.	300, **600**	P G ..	X	—	—
Cruso[1]	WNIA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cubadist[2]	KNV	—	Cuba Dist. Co.	300, 450, **600**	P G ..	—	—	—
Cumberland[1]	WKOI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Curacao[2]	WGK	—	Pacific S.S. Co.	300, **600**	P G ..	X	0.20	—
Curlew[3]	KOSZ	—	Curlew Co.	300, **600**	P G ..	X	—	—
Currier[5]	KNU	—	Gulf Ref. Co.	300, 450, **600**	P G ..	—	—	—
Cushnet[1]	KONB	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cushnoc[1]	KIMJ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Custodian[1]	KIVZ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Cuttyhunk[1]	KONC	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Daca[1]	KKIA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Dade County[1] ..	KIJZ	—	U.S Shipping Board.	300, **600**	P G ..	X	0.20	—
Dakotan[2]	WKD	—	American-Hawaiian S.S. Co ..	300, **600**	P G ..	X	0.20	—
Dalagada[1]	KEDC	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—
Dalana[2]	KQAU	—	Nacirema S.S. Corp.	300, **600**	P G ..	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Dallas [1]	KEQB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Damacan [1]	KELS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Damura [1]	KPEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dancey [1]	WSAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Danebrog [1]	WXAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Daniel Webster [1]	KOKM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dannedaike [1]	KOPD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Danvers [1]	KOSK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Danville [1]	KOSJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
D'Arbonne [1]	KESX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dardania [1]	KICD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dardora [1]	KELT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Darrah [1]	WZIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Datis [1]	KICF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dauperata [1]	KIZJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Davidson County [1]	KINX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dawnlite [2]	KPP	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	X	0.20	—	
Daylite [2]	KPR	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	X	0.20	—	
Dayton [2]	KNP	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Decatur Bridge [1]	KECJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Deepwater [2]	KLY	—	Castner, Curran & Bullitt	300, **600**	P G	X	0.20	—	
Deerfield [2]	WTIU	—	El Dorado S.S. Co.	300, **600**	P G	X	0.20	—	
Deerlodge [1]	KIMD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Defender [2]	KOJF	—	Atlantic Transport Co.	300, **600**	P G	X	0.20	—	
Defiance [1]	WSEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delanson [1]	KOTX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delavan [1]	KIRQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delco [1]	KIZB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delfina [1]	KIVS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delisle [1]	KIVT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delight [1]	KQOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Delphine [2]	KIFL	—	H.E. Dodge	300, **600**	P G	X	0.20	—	
Democracy [1]	WAQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Deranof [1]	KQIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Derbyline [1]	KIRT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Deroche [1]	KOBJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Dertona [1]	KICG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Ship	Call		Owner	Wave lengths				
De Soto[2]	KNI	—	Standard Oil Co. of New Jersey	300, 600	P G	—	—	—
Despatch[2]	WOA	—	Seattle S.S. Co.	300, 600	P G	X	0.20	—
Detroit-Wayne[1]	KONX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Deuel[4]	KOMD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Deva[1]	KICK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Devolente[1]	KIVR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dewey[1]	KODT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
D. G. Scofield[2]	WRD	—	Standard Oil Co., of California	300, 450, 600	P G	X	0.20	—
Diablo[1]	KEPD	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Diana[1]	KICJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dillwyn[1]	KODX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dilworth[1]	KOVJ	—	U.S Shipping Board	300, 600	P G	X	0.20	—
Dio[1]	WNEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Director[1]	KIGJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dirigo[1]	KEGM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dochet[1]	KIMR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dochra[2]	KGL	—	La Plata S.S. Co.	300, 450, 600	P G	X	0.20	—
Dora[2]	WAH	—	N. C. Eggen	300, 600	P G	—	—	—
Dorchester[2]	KQD	—	M. & M. Tr. Co.	300, 450, 600	P G	—	—	—
Dorothy Bradford[2]	KNA	—	Cape Cod S.S. Co.	300, 450, 600	P G	—	—	—
Dorothy Palmer[2]	KQW	—	France-Can. S.S. Co.	300, 450, 600	P G	X	0.20	—
Doylestown[1]	KIPG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dreadnought[2]	WGL	—	Hind-Rolph & Co.	300, 600	P G	X	0.20	—
Dryden[2]	KORK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Dungeness[1]	WPOI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Duquesne[1]	KECS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eagle[2]	KIR	—	Standard Trans. Co.	300, 450, 600	P G	X	0.20	—
Eagle[2]	WRP	—	S.O. & M.T. B. Co.	300, 600	P G	—	—	—
East Cape[1]	KENC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
East Cliff[1]	KSIA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Easterling[1]	KEJD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Breeze[4]	KOPP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Chief[1]	KSEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Cross[1]	WKIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Easterner[1]	WGEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern King[1]	WFEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Light[1]	WKII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Queen[1]	KXUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Sea[1]	KTEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Shore[1]	WKIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern Star[1]	KTAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastern States[2]	WEE	—	D. & C. Navigation Co.	300, 600	P G	X	0.20	—
Eastern Sun[1]	KTIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
East Indian[1]	WGEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eastport[1]	WCIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
East Side[1]	KIMQ	—	U.S. Shipping Board	300, 600	P.G	X	0.20	—
East Wind[1]	KEKB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eclipse[1]	KEGE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
E. C. Pope[1]	WZAU	—	Inter-Coast S.S. Co.	300, 600	P G	X	0.20	—
Ecuador[4]	WBN	—	Pacific Mail S.S. Co.	300, 600	P G	—	—	—
Edellyn[4]	KIJL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Edenton[1]	KECB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Edgar F. Luckenbach[4]	KGK	—	Luckenbach S.S. Co.	300, 450, 600	P G	—	—	—
Edgecombe[1]	WQUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Edgefield[1]	KEBF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edgehill[1]	KETN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edgemont[1]	KETP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edgemoor[1]	KEVF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edgewood[1]	KICM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edisto[1]	KILG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edith[3]	KZF	—	A. H. Bull S.S. Co.	300, **600**	P G	—	—	—	
Editor[1]	KOBG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edmore[1]	KILJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edna[1]	KIPT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Edward J. Lawrence[2]	KQY	—	French Overseas Corp.	300, 450, **600**	P G	X	0.20	—	
Edward L. Doheny[2]	WIE	—	Pan-American Pet. & Trans. Co.	300, 450, **600**	P G	X	0.20	—	
Edward L. Doheny, Jr.[2]	WIJ	—	Pan-American Pet. & Trans. Co.	300, 450, **600**	P G	—	—	—	
Edward Luckenbach[4]	KGQ	—	Luckenbach SS.. Co.	300, 450, **600**	P G	—	—	—	
Edward Pierce[3]	KMOU	—	Cromwell & Thurlow S.S. Co.	310, **600**	P G	—	—	—	
Eelbeck[1]	KINQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Effingham[1]	KOLT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Effna[2]	KOMT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Eglantine[4]	KOPT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Egremont[1]	KOQS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Eider[1]	KOKJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
E. J. Earling[2]	WEI	—	Franklin S.S. Co	300, 450, **600**	P G	X	0.20	—	
El Alba[3]	KKL	—	Southern Pacific Co.	300, 450, **600**	P G	—	—	—	
El Almirante[3]	KKG	—	Southern Pacific Co.	300, 450, **600**	P G	—	—	—	
El Capitan KKH[3]	KKH	—	Southern Pacific Co.	300, 450, **600**	P G	—	—	—	
El Capitan WNB[2]	WNB	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	X	0.20	—	
El Cid[2]	KKT	—	Southern Pacific Co.	300, 450, **600**	P G	X	0.20	—	
Eldena[1]	KEVG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
El Dia[2]	KKY	—	Southern Pacific Co.	300, 450, **600**	P G	X	0.20	—	
E. L. Doheny III[1]	WROO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Eldora[1]	KELF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Eldorado[3]	KMOI	—	Western Transport Co.	300, **600**	P G	X	0.20	—	
Eldridge[1]	KICN	—	U.S. Shipping Board	300, **600**	P G	—	—	—	
Elihu Thomson[3]	KEXD	—	North Pacific Sea Products Co.	300, **600**	P G	X	0.20	—	
Elinor[1]	KVR	—	U.S. Shipping Board	300, **600**	P G	—	—	—	
Elkhorn[1]	KOCL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Elkridge[1]	KISG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Elkton [1]	KOPK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Elkwater [1]	KILS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
El Mundo [3]	KKU	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
Elmsport [1]	KILF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
El Norte [3]	KKN	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
El Occidente [3]	KKX	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
El Oriente [2]	KKV	—	Southern Pacific Co.	300, 600	P G	X	0.20	—
El Rio [3]	KKZ	—	Southern Pacific Co.	300, 450, 600	P G	X	0.20	—
El Segundo [3]	WTQ	—	Standard Oil Co. of California	300, 600	P G	X	0.20	—
El Siglo [2]	KKS	—	Southern Pacific Co.	300, 450, 600	P G	X	0.20	—
El Sol [2]	KKB	—	Southern Pacific Co.	300, 600	P G	X	0.20	—
El Sud [3]	KKQ	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
El Valle [3]	KKW	—	Southern Pacific Co.	300, 600	P G	—	—	—
Endicotte [1]	KODN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Englewood [1]	WGAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Enterprise [2]	WMN	—	Matson Nav. Co.	300, 450, 600	P G	—	—	—
Eocene [3]	KTM	—	Standard Oil Co. of New York	300, 600	P G	—	—	—
Epitacio Pessoa [1]	KOCC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ernest H. Meyer [3]	WMJ	—	Broughton & Wiggins Nav. Co.	300, 600	P G	X	0.20	—
Erny [1]	WLM	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
E. R. Sterling [3]	WIS	—	Sterling Ship Co.	300, 600	P G	—	—	—
Escambia [4]	KOGK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Esopus [1]	KETF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Esparta [3]	KDO	—	United Fruit Co.	300 450, 600	P G	—	—	—
Esperanca [3]	WIO	—	Esperanca Motorship Co.	300, 600	P G	—	—	—
Esperanza [5]	KWZ	—	New York & Cuba Mail S.S. Co.	300, 450, 600	P G	—	—	—
Essex [2]	KQE	—	Merchants & Miners Transport Co.	300, 450, 600	P G	—	—	—
Eten [1]	KEQT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ethelmute [1]	KEMB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Euharlee [1]	WSIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eurana [2]	KJG	—	The Nafra Co.	300, 600	P G	—	—	—
Evangeline [3]	KII	—	J. W. Elwell & Co.	300, 600	P G	X	0.20	—
Evansville [1]	KIKT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Evelyn KZP [3]	KZP	—	A. H. Bull & Co.	300, 600	P G	—	—	—
Everett [2]	KZT	—	New England Fuel & Transport Co.	300, 600	P G	—	—	—
Everglades [1]	WQEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Excelsior [3]	KKO	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
Explorer [1]	KIVN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Eyota [3]	KKII	—	Matson Nav. Co.	300, 600	P G	—	—	—
Fairfield [1]	WSAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fairmont [3]	KXT	—	Coastwise Transport Co.	300, 600	P G	X	0.20	—
Fair Oaks [3]	WSM	—	Parr-McCormick Co.	300, 600	P G	X	0.20	—
Faith [3]	KJOA	—	S.F. Shipbulding Co.	300, 600	P G	—	—	—
Falmouth [1]	WKOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fame [1]	KEDL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Faraby [1]	KEJV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fargo [1]	KONL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fassett [1]	KMUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Favel [1]	WQUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Favorite WCF [3]	WCF	—	Great Lakes Towing Co.	300, 600	P G	X	0.20	—
Favorite KIFG [2]	KIFG	—	Great Lakes Towing Co.	300, 600	P G	X	0.20	—
Fayette Brown [3]	WQG	—	H. H. Brown & Co.	300, 450, 600	P G	X	0.20	—
F. B. Squire [2]	WFU	—	Jenkins S.S. Co.	300, 450, 600	P G	X	0.20	—
F. D. Asche [3]	KSUA	—	Standard Oil Co. of New Jersey	300, 600	P G	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Federal [1]	WDOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Federal Bridge [4]	KOCN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Felix Taussig [3]	KXZ	—	Crowell & Thurlow S.S. Co.	300, **600**	P G	—	—	—	
Feltore [2]	KFG	—	Oregon S.S. Corporation	300, 450, **600**	P G	X	0.20	—	
Fernandina [1]	WTIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Finback [2]	KEMQ	—	American Arctic Corporation	300, **600**	P G	X	0.20	—	
Finland [3]	KSF	—	Inter-Merc. Mar. Co.	300, **600**	P G	—	—	—	
Fire Island [2]	KODJ	—	American Northern, Norway and West Indies S.S. Co.	300, **600**	P G	X	0.20	—	
Firmore [3]	KDX	—	Oregon S.S. Corporation	300, 450, **600**	P G	—	—	—	
Firthcliffe [1]	KITF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fish Hawk [3]	WKIA	—	East Coast Fisheries Co.	300, **600**	P G	—	—	—	
F. J. Luckenbach [1]	WNZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Florence Luckenbach [4]	WNM	—	Luckenbach S.S. Co.	300, **600**	P G	—	—	—	
Florence Olson [3]	WPK	—	O. J. Olson & Co.	300, **600**	P G	—	—	—	
Florida WJJ [2]	WJJ	—	Goodrich Transit Co.	300, **600**	P G	X	0.20	—	
Florida KUS [2]	KUS	—	The Texas Co.	300, 450, **600**	P G	X	0.20	—	
Floridian [3]	WLR	—	American Hawaiian S.S. Co.	300, 450, **600**	P G	—	—	—	
Fluor Spar [1]	KIQX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Folsom [1]	WQOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fonduco [1]	KNUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fordonian [2]	KRU	—	American-Medit. S.S. Co.	300, **600**	P G	X	0.20	—	
Forster [1]	KKIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Bragg [2]	WLH	—	C. H. Higgins	300, **600**	P G	—	—	—	
Fort George [1]	KBIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Harrison [1]	WNOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Leavenworth [1]	KEPB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Pierce [1]	WJUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Pitt Bridge [1]	KWB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Riley	WNOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Russell [1]	WNOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Scott [1]	KEBJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Seward [1]	KEVJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Sill [1]	KEBL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Smith [1]	KEBK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Snelling [1]	WNOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Fort Stanwix [1]	KEVK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Fort Stevens [1]	KEBG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fort Wayne [1]	WDOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fort Worth [1]	KLD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fort Wright [1]	KTEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fourth Alabama [1]	KIXJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
F. Q. Barstow [2]	KNQ	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Francis L. Skinner [4]	WQK	—	H. F. Ostrander	300, 450, 600	P G	—	—	—
Frank H. Buck [6]	WTO	—	Associated Oil Co.	300, 600	P G	—	—	—
Franklin [3]	WFF	—	Coastwise Transit Co.	300, 450, 600	P G	X	0.20	—
Franklin County [1]	KOTV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Fred Baxter [3]	WOG	—	Fred Baxter S.S. Co.	300, 600	P G	—	—	—
Frederic R. Kellogg [2]	WIQ	—	Pan-American Pet. & Trans. Co.	300, 600	P G	—	—	—
Fred'k Luckenbach [4]	KGV	—	Luckenbach S.S. Co.	300, 600	P G	—	—	—
Fred. W. Weller [2]	KNY	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Freedom [1]	KFW	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Freeman [2]	WMM	—	Pocahontas Fuel Co.	300, 600	P G	—	—	—
Freeport Sulphur No. 1 [2]	KRA	—	Freeport Sulphur Transit Co.	300, 600	P G	—	—	—
Freeport Sulphur No. 2 [2]	KRG	—	Freeport Sulphur Transit Co.	300, 600	P G	X	0.20	—
Fresno [1]	KTIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Frieda [4]	KFF	—	Union Sulphur Co.	300, 600	P G	—	—	—
Ft. Logan [4]	KIQJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Gaffney [1]	KICR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
G. A. Flagg [1]	WZEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Galahad [1]	KEQR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Galesburg [1]	WGAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Ganeri [1]	KERL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Garfield [1]	WQOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Gargoyle [2]	KRK	—	Vacuum Oil Co.	300, 450, 600	P G	X	0.20	—
Garibaldi [1]	KROU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Gene Crawley [2]	KQF	—	Sinclair Gulf Corp.	300, 600	P G	—	—	—
General G. W. Goethals [3]	KMZ	—	Panama Railroad Co.	300, 600	P G	—	—	—
General H. F. Hodges [3]	KPG	—	Panama Railroad Co.	300, 600	P G	—	—	—
General O. H. Ernst [3]	KPF	—	Panama Railroad Co.	300, 600	P G	—	—	—
General W. C. Gorgas [3]	KIP	—	Panama Railroad Co.	300, 600	P G	—	—	—
Genesee [3]	KIDL	—	W. K. Vanderbilt, jr.	300, 600	P G	—	—	—
George E. Paddleford [2]	WIV	—	Pan.-Amer. Petroleum & Transport Co.	300, 600	P G	X	0.20	—
George G. Henry [2]	WIT	—	P.A. Pet & Transit Co.	300, 600	P G	—	—	—
George H. Jones [2]	KIPS	—	Standard Oil Co. of New Jersey	300, 600	P G	—	—	—
George W. Barnes [2]	KMUI	—	P.A. Pet & Transit Co.	300, 600	P G	—	—	—
Georgia KUR [5]	KUR	—	The Texas Co.	300, 450, 600	P G	—	—	—
Georgia WFA [2]	WFA	—	Goodrich Transit Co.	300, 600	P G	X	0.20	—
Georgina Rolph [3]	KETX	—	Rolph Nav. & Coal Co.	300, 600	P G	—	—	—
Glendola [1]	KFAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Glendoyle [1]	KFAO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Glenpool [2]	KOH	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Glen Ridge [2]	KIRZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Glen White [2]	KSIE	—	Castner Curran & Bullitt	300, 600	P G	X	0.20	—
Glorieta [1]	KJO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Gloucester [2]	KQG	—	Merchants & Miners Transport Co.	300, 450, 600	P G	—	—	—
Glymont [1]	KEXZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Glyndon [1]	KEZQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Gold Shell [2]	WIB	—	Shell Line	300, 450, 600	P G	X	0.20	—
Gonzalis [1]	KOBQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Goodspeed [1]	WKEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Goree [1]	WLII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Governor [2]	WGR	—	Pacific S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Governor Brooks [2]	KPZ	—	France-Canada S.S. Co.	300, **600**	P G	X	0.20	—	
Governor Cobb [2]	KRB	—	Eastern S.S. Lines	300, **600**	P G	—	—	—	
Governor Dingley [2]	KRV	—	Eastern S.S. Lines	300, **600**	P G	—	—	—	
Governor Forbes [1]	KOQV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Governor John Lind [1]	WREU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Grand Haven [2]	KEXR	—	Gr. Trunk Car. Fy. Line	300, **600**	P G	X	0.20	—	
Gratia [2]	KIGP	—	Gratia Nav. Co	300, **600**	P G	X	0.20	—	
Gray Cloud [1]	KEZV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Gray Eagle [1]	KEZT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Grayling [1]	KEVL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Grecian [2]	KQR	—	Merchants & Miners Transport Co.	300, 450, **600**	P G	—	—	—	
Greenwood [3]	WLL	—	Greenwood S.S. Co.	300, **600**	P G	—	—	—	
Guantanamo [5]	KWN	—	New York & Cuba Mail S.S. Co.	300, 450, **600**	P G	—	—	—	
Guardian [3]	WGZ	—	Central & South American Telegraph Co.	300, **600**	P G	—	—	—	
Guardsman [1]	KIVX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Guaro [1]	WJV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Guilford [1]	KEMF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Guimba [1]	WJIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Gulfcoast [3]	KUE	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulfland [5]	KUD	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulflight [3]	KUA	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulfmaid [2]	KUB	—	Gulf Refining Co.	300, 450, **600**	P G	—	—	—	
Gulfoil [6]	KTG	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulf of Mexico [3]	KUC	—	Gulf Refining Co.	300, 450, **600**	P G	—	—	—	
Gulfport [3]	KREE	—	F. & T. F. O. Transit Co.	300, **600**	P G	—	—	—	
Gulf Queen [5]	KVS	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulf Stream [5]	KTB	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Gulftrade [3]	KOVB	—	Gulf Refining Co.	300, **600**	P G	X	0.20 [7] 0.40 [8]	—	
Gunston Hall [1]	KICV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Gut Heil [1]	WRAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Haddon [1]	KIRN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hadnot [4]	KOGP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Hagan[1]	KOQC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hagood[1]	KOQD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Halcyon[2]	KZL	—	D. W. Flint	300, 600	P G	—	—	—
Haleakala[5]	KORL	—	U.S. Shipping Board	300, 600	P G	N	0.20	—
Hamilton[2]	KOA	—	U.S. R.R. Administration	300, 450, 600	P G	—	—	—
Hamlin[1]	KOJC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hampden[2]	WXUI	—	Coastwise Transit Co.	300, 600	P G	X	0.20	—
Hampton Roads[1]	KESR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hancock County[1]	KORT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hanover[5]	KOJK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Harish[1]	WSIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Harold Walker[2]	WIX	—	P.A. Pet. & Tr. Co	300, 450, 600	P G	—	—	—
Harry Farnum[2]	KQA	—	Sinclair Gulf Corp.	300, 600	P G	—	—	—
Harry W. Croft[2]	WQF	—	H. H. Brown & Co.	300, 450, 600	P G	X	0.20	—
Hartford[1]	KOSX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hartwood[2]	KEVR	—	Hartwood Lumber Co.	300, 600	P G	—	—	—
Harvey H. Brown[2]	WQE	—	Castner, Curran & Bullitt	300, 450, 600	P G	X	0.20	—
Hatchil[1]	KIVJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hathaway[1]	KODK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hatteras[1]	WNV	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Hattie Luckenbach[4]	WNF	—	Luckenbach S.S. Co.	300, 600	P G	X	0.20	—
Haverhill[1]	WLUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hawaiian[2]	WKU	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
H. C. Cadmus[2]	KVT	—	Neptune Line	300, 450, 600	P G	X	0.20	—
H. C. Folger[2]	KHS	—	Atlantic Ref. Co.	300, 450, 600	P G	—	—	—
Heffron[1]	WBAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hegira[1]	KIDF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Helen[5]	KZH	—	Bull Insular S.S. Co.	300, 600	P G	—	—	—
Henry Clay[1]	KESZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Henry County[1]	KOMS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Henry J. Biddle[2]	WOW	—	Western Fuel Co.	300, 600	P G	—	—	—
Henry M. Flagler[2]	KOX	—	F.E.C.C.F. Co.	300, 600	P G	X	0.20	—
Henry R. Mallory[5]	KEF	—	Mallory S.S. Co.	300, 450, 600	P G	—	—	—
Herbert G. Wylie[2]	WIF	—	P.A. Pet & Tr. Co.	300, 450, 600	P G	—	—	—
Herbert L. Pratt[1]	KOY	—	Atlantic Refining Co.	300, 600	P G	X	0.20	—
Hercules KOCT[1]	KOCT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Heredia[2]	KDH	—	United Fruit Co.	300, 600	P G	—	—	—
Herman Winter[2]	WDAO	—	Coast S.S. Co.	300, 600	P G	X	0.20	—
Hermosa[2]	WBP	—	Wilmington Transit Co.	300, 500, 600	P G	X	0.20	—
Hewitt[2]	KIL	—	Union Sulphur Co.	300, 600	P G	—	—	—
H. F. Dimock[1]	KEN	—	Eastern S.S. Corp.	300, 600	P G	X	0.20	—
H. H. Rogers[2]	KSI	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Hickman[1]	WFOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hico[1]	KECK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hillsborough County[1]	KIKB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hilton[2]	KZK	—	A. H. Bull S.S. Co.	300, 600	P G	X	0.20	—
Himoto[1]	KILC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hisko[2]	WQD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
H. M. Flagler[2]	KER	—	Standard Oil Co. of New Jersey	300, 450, 600	F G	X	0.20	—
H. M. Whitney[2]	WPV	—	Whitney S.S. Co.	300, 600	P G	—	—	—
Hog Island[2]	KODV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Hokah[1]	WJAB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Holbrook[1]	WQII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Holden Evans[2]	KMY	—	H. A. Evans S.S. Co.	3' 0, 600	P G		—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Hollywood [3]	WKH	—	Hollywood S.S. Corp.	300, 450, **600**	P G	—	—	—	
Homestead [1]	KEKR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Honolulu [2]	WMZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hoosac [1]	WQAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Horace X. Baxter [3]	WOF	—	Horace X. Baxter S.S. Co.	300, **600**	P G	—	—	—	
Horado [2]	KECT	—	Nacirema S.S. Corp.	300, **600**	P G	X	0.20	—	
Houma [1]	WTUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hoven [1]	KEXV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Howard [2]	KQH	—	M. & M. Transit Co.	300, 450, **600**	P G	—	—	—	
Howick Hall [2]	KLT	—	United States Steel Products Co.	300, **600**	P G	—	—	—	
Hoxbar [1]	KIJQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hoxie [1]	KEMK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Huachaca [2]	KIMX	—	Orinoco S.S. Corporation	300, **600**	P G	X	0.20	—	
Hugoton [1]	KIQR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Huguenot [1]	KIVQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hukey [1]	KIFC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hulaco [1]	KODQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Hulver [1]	KIGD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Humaconna [1]	KIGC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Humboldt [2]	WHX	—	James Jerome	300, **600**	P G	X	0.20	—	
Humrick [1]	KIFN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Huron KVH [2]	KVH	—	Clyde S.S. Co.	300, 450, **600**	P G	—	—	—	
Huron WCH [2]	WCH	—	Huron S.S. Co.	300, 500, **600**	P G	X	0.20	—	
Hyades [2]	WMK	—	Matson Nav. Co.	300, 450, **600**	P G	—	—	—	
Hyannis [1]	KINC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ice King [1]	KJUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Iceland [4]	KOKK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Iconium [1]	WQUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ida [1]	WLV	—	U.S. Shipping Board	300, 45[illegible], **600**	P G	X	0.20	—	
Idaho WOO [2]	WOO	—	Wilson Bros. & Co.	300, **600**	P G	X	0.20	—	
I. D. Fletcher [2]	KFI	—	Coast Transit Co.	300, **600**	P G	X	0.20	—	
Illinois [2]	WCZ	—	Northern Mich. Transit Co.	300, **600**	P G	X	0.20	—	
Imlay [1]	KIZV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Imufka [1]	KEDS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Inco No. 1 [2]	WQA	—	Inland Nav. Co.	300, 450, **600**	P G	X	0.20	—	
Independence [1]	WJIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Independent Bridge [4]	KOGB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Indiana[3]	WFC	—	Goodrich Transit Co.	300, 600	P G	X	0.20	—	
Indiana Bridge[1]	KOND	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Indianapolis[1]	WROE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Ingold[1]	WLUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Innoko[1]	KITJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Inspector[3]	KOKR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Intan[1]	KIGK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Invincible[1]	WCII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Iowan[2]	WKJ	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—	
Ipswich[5]	KILV		Shawmut S.S. Co.	300, 600	P G	X	0.20	—	
Iris[2]	WOJ	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—	
Iroquois[2]	KVF	—	Clyde S.S. Co.	300, 450, 600	P G	—	—	—	
Irvington[2]	KOGQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Isaac L. Rice[3]	WKK	—	Electric Boat Co.	300, 450, 600	P G	—	—	—	
Isabela[2]	KGW	—	N.Y. & P.R.S.S. Co.	300, 600	P G	—	—	—	
Isanti[1]	WVEU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Isonomia[1]	KEL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Issaquena[1]	KPIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Itanca[1]	WGUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Itompa[2]	KENR	—	Nacirema S.S. Co.	300, 600	P G	X	0.20	—	
J. A. Bostwick[2]	KJN	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	X	0.20	—	
Jackson[1]	KIK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Jacksonville[1]	KOJG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Jacona[1]	WQUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Jacox[1]	KEML	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Jadden[4]	KORM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
James McGee[2]	KTP	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	X	0.20	—	
James Timpson[2]	WTA	—	Resolved Corporation	300, 600	P G	X	0.20	—	
James S. Whitney[3]	WPW	—	Acme S.S. Corp.	300, 600	P G	—	—	—	
Jamestown[3]	KOC	—	Old Dominion Line	300, 450, 600	P G	—	—	—	
J. A. Moffett[2]	WRE	—	Standard Oil Co. of California	300, 600	P G	X	0.20	—	
Jane Palmer[2]	KPY	—	France & Canada S.S. Co.	300, 450, 600	P G	X	0.20	—	
Jason KNJ[2]	KNJ	—	Jason Nav. Co.	300, 600	P G	—	—	—	
J. B. Stetson[2]	WVUE	—	Pacific Merc. Mar. Co.	300, 600	P G	—	—	—	
J. C. Donnell[1]	WJM	—	Atlantic Refining Co.	300, 600	P G	X	0.20	—	
Jean[2]	KZJ	—	A. H. Bull S.S. Co.	300, 600	P G	X	0.20	—	
Jeannette Skinner[1]	WQW	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—	
Jefferson KOD[3]	KOD	—	U.S. R.R. Administration	300, 450, 600	P G	—	—	—	
Jefferson WAJ[4]	WAJ	—	Alaska S.S. Co.	300, 600	P G	—	—	—	
Jefferson County[1]	KIKF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Jekyl[1]	KEBS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
J. E. O'Neil[4]	KSB	—	Atl. Refg. Co.	300, 600	P G	—	—	—	
J. L. Luckenbach[4]	KGT	—	Luckenbach S.S. Co.	300, 600	P G	X	0.20	—	
J. M. Danziger[2]	WIW	—	P.A. Pet. & Tr. Co.	300, 450, 600	P G	—	—	—	
J. M. Guffey[5]	KTF	—	Gulf Ref. Co.	300, 600	P G	—	—	—	
Joan of Arc[3]	KETV	—	Rolph Nav. & Coal Co.	300, 600	P G	—	—	—	
Johanna Smith[2]	WHZ	—	Int. Ocean Tr. Co.	300, 600	P G	X	0.20	—	
John Adams[2]	KOSS	—	U S. Shipping Board	300, 600	P G	X	0.20	—	
John D. Rockfeller[2]	KTO	—	Standard Oil Co. of New Jersey	300, 600	P G	—	—	—	
John Ena[1]	KIRS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
John M. Connelly[5]	KJEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
John P. Reiss[2]	WNY	—	North American S.S. Co.	300, 600	P G	X	0.20	—	
John Roach[1]	KOSN	—	U.S. Shipping Board	300, 600	P G	N	0.20	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Johnson City [1]	KIKD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
John W. Wells [1]	KOCR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Jonancy [2]	KSEU	—	Pocah Fuel Co.	300, **600**	P G	—	—	—	
Joseph R. Parrott [2]	KJP	—	F.E.C.C.F. Co.	300, 450, **600**	P G	X	0.20	—	
Josiah Macy [3]	KEX	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
J. R. Gordon [3]	KOML	—	Union Sulphur Co.	—	—	—	—	—	
Julia Luckenbach [5]	KGZ	—	Luckenbach S.S. Co.	300, 450, **600**	P G	—	—	—	
Juneau [5]	WAM	—	Alaska S.S. Co.	300, 5[illegible]0, **600**	P G	—	—	—	
Juniata KQJ [2]	KQJ	—	M. & M. Tr. Co.	300, 450, **600**	P G	—	—	—	
Juniata WCB [2]	WCB	—	Great Lakes Transit Co.	300, **600**	P G	X	0.20	—	
J. W. Van Dyke [3]	KHR	—	Atl. Ref. Co.	300, 450, **600**	P G	—	—	—	
Kaleen [1]	KOKV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kamesit [1]	KEDG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kanabec [2]	WMII	—	Kanabec S.S. Co.	300, **600**	P G	X	0.20	—	
Kanak [3]	KOT	—	Alaska Packers Association	300, 450, **600**	P G	—	—	—	
Kanakee [1]	WVUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kanawha [3]	KYA	—	John Borden	300, **600**	P G	—	—	—	
Kangi [1]	WRUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Karina [3]	KYR	—	T. P. Burgess	300, **600**	P G	—	—	—	
Kaskasia [1]	KNOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kasota [1]	KPAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Katherine [2]	KIZK	—	Philippine Vegetable Oil Co.	300, **600**	P G	X	0.20	—	
Katia [3]	KZUA	—	Katia S.S. Corp.	300, **600**	P G	—	—	—	
Katonah [1]	KERD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Katrina Luckenbach [1]	KWU	—	Edgar F. Luckenbach	300, **600**	P G	X	0.20	—	
Kaweah [1]	KOKL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kayseeka [1]	KOQS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kearny [1]	KOPR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Keketticut [1]	KZEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kenosha [1]	KPIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kenowis [1]	KOSV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Kentuckian [3]	WKE	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—	
Kenwood Bridge [2]	KOGG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Keota [1]	WXAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Keresan [2]	WJC	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—	—	—	
Keresaspa [2]	KQI	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—	—	—	
Kerkenna [2]	WPJ	—	Kerr Nav. Co.	300, **600**	P G	—	—	—	

Kerlew [2]	KQP	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—		
Kermanshah [2]	KLX	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—		
Kermoor [2]	WJB	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—	—	
Kerowlee [2]	WGW	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—	—	
Kershaw [2]	KQK	—	Merchants & Miners Transport. Co.	300, 450, **600**	P G	—	—	
Kerwood [2]	WPM	—	Amer. Ship & Commerce Nav. Corp.	300, **600**	P G	—	—	
Keshena [1]	KITR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Ketchikan [4]	WAE	—	Alaska S.S. Co.	300, **600**	P G	—	—	—
Kewanee [1]	KIVC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kickapoo [1]	KVEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kilkenny [3]	KKI	—	Department of Commerce	300, 450, **600**	P R	—	—	—
K. I. Luckenbach [1]	KHY	—	Edgar F. Lackenbach	300, **600**	P G	X	0.20	—
Kimta [1]	KIFS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kineo [1]	KPUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kingfisher [3]	KMAO	—	East Coast Fisheries Co.	300, **600**	P G	—	—	—
Kingfisher [3]	KOQR	—	Kingfisher Co.	—	—	—	—	—
Kiokee [1]	KITS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kiowa [1]	KRL	—	Clyde S.S. Co.	300, **600**	P G	X	0.20	—
Kishacoquillas [1]	KIFJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kisnop [1]	KIJK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kitchi [1]	KITV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kittegaun [1]	KITG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kiron [1]	KITT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Klamath WSX [2]	WSX	—	Klamath S.S. Co.	300, **600**	P G	X	0.20	
Klamath WMOU [1]	WMOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Knights Island [1]	KIVL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	
Knoxville [1]	KIJN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	
Kokomo [1]	KEJB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kolda [1]	KOKX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kootenai [1]	KOGF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kroonland [3]	KSH	—	Inter. Merc. Marine	300, **600**	P G	—	—	—
Kusdeca [1]	WGUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	
Kuwa [1]	WCEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Kvichak [3]	WNS	—	Alaska Packers' Association	300, **600**	P G	—	—	—
Laborer [1]	KIST	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Labette [1]	KIZX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
La Brea [6]	WON	—	Union Oil Co.	300, **600**	P G	—	—	—
Lackawanna [2]	KOP	—	Lackawanna S.S. Co.	300, 450, **600**	P G	X	0.20	—
Lackawanna Bridge [2]	KOGC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lackawanna Valley [1]	KIXD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
La Crosse [1]	KONM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lafcomo [1]	KIXK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
La Forge [1]	WGAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Agomak [1]	KZEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	
Lake Akkra [1]	KVUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Allen [1]	KLEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Alvada [1]	KXAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Annette [1]	KKOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Arline [1]	KZOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Arthur [1]	WFL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Aurice [1]	KZIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Beacon [1]	WTAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Belona [1]	KZII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Lake Benbow [1]	KVAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Lake Benton[1]	KSIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Berdan[1]	KZEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Blanchester[1]	KTIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Bledsoe[1]	KTUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Bridge[1]	KBAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Buckeye[1]	WSEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Butler[1]	WFN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Cahoon[1]	WKEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Calistoga[1]	KXIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Callicoon[1]	WNAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Calvenia[1]	WXOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Canaveral[1]	KIDS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Candlearia[1]	KIJB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Cannonsburg[1]	KIMV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Capens[1]	KLUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Cathcoon[1]	WLEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Catherine[1]	KSII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Cayuga[1]	KLUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Champlain[1]	KBIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Charles[1]	KHW	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Charlotte[1]	KQEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Charlottesville[1]	WNEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Chelan[1]	KQUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Clear[1]	KLEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Como[1]	KLIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Conesus[1]	KSAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Conway[1]	KLIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Copley[1]	WKAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Crescent[1]	WAP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Crystal[1]	KLAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Damita[1]	KTAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Dancey[1]	KZEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Daraga[1]	KRIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Delancey[1]	KXAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Desha[1]	WTAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Deval[1]	WKEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Duane[1]	KLII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Lake Duncan[1]	KSOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Dunmore[1]	KBEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Dymer[1]	KZEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Eckhart[1]	KSOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Eliko[1]	KTAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elizabeth[1]	WOP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elkwater[1]	KEPM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elkwood[1]	KENP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellendale[1]	KEPN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellenorah[1]	KEPP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellerslie[1]	KEQM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellicott[5]	KEQN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellijay[4]	KOBL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellithorpe[1]	KOFM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellsbury[1]	KOFP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ellsworth[4]	KOCZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elmdale[1]	KOLR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elmhurst[1]	KOFQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elmont[1]	KOQG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elmsford[1]	KOVG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elon[1]	KOBZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elpueblo[3]	KOFV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elrio[6]	KOKQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elsah[1]	KOSR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elsinore[1]	KRII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Elsmere[1]	KONT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Ennis[1]	KLUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fablus[5]	KIPQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fabyan[1]	KINJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fackler[1]	KIQP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fagundus[1]	KISN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fairfax[1]	KIRV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fairlie[1]	KISP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fairport[1]	KOGR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Falama[4]	KITB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Falun[1]	KOTB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fanbush[1]	KEJN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fannin[1]	KECN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fanquier[1]	KEKN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fansdale[5]	KEKM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farabee[1]	KEBP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Faresman[1]	KEVZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farge[1]	WLEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Faribault[1]	KEDM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Faristall[1]	WLEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Fariston[3]	KEDN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farley[4]	KEDP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farlin[1]	KIGM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farmingdale[1]	KIPZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farragut[1]	KIQN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Farrar[3]	KISX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Faulk[3]	KEJP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Favonia[5]	KOJP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Lake Faxon[1]	KOLJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per-Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Lake Fear [4]	KIVM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Felden [1]	KOLK	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Felicity [1] ..	KLOA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fenn [1]	KOTT	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fernalda [1] ..	KOPB	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fernando [1] ..	KELM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fernwood [1] ..	KDEA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Ferrona [1]	KELN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fessenden [1] ..	KELP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Festina [1]	KEPQ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Festinia [1]	KEQP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Festus [1]	KERM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fibre [1]	KERN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fielding [1] ..	KERP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fife [1]	KESM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Figaret [8]	KESN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fighting [1] ..	KESP	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Filbert [1]	KONV	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fillion [1]	KOPV	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fiscus [1]	KOCG	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fisher [1]	KODD	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fitch [1]	KOJQ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fithian [1] ..	KOKZ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flagstaff [1] ..	KIZM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flambeau [5] ..	KIZN	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flanders [3] ..	KOGT	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flatonia [1] ..	KOGS	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flattery [1] ..	KOMC	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flovilla [1] ..	KESK	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flume [1]	KMUU	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flushing [1] ..	KEBV	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fluvanna [1] ..	WLAU	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Flynus [1]	KECV	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Folgroft [1] ..	KEXL	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fonda [1]	KEZC	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fondulac [1] ..	WSEO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Lake Fontana [1] ..	KEZD	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	

Lake Fontanet[1]	KEZF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Forest[1]	KBII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Forkville[1]	WLEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Forney[1]	WBUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Forsby[1]	WCUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fossil[1]	WCUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fostoria[1]	WPIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fouche[1]	WPIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Foxboro[1]	KESB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Foxcraft[1]	KEGL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fraichur[1]	KEJG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fraley[1]	KEJJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frampton[1]	WCUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frances[6]	KTAO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Franconia[1]	WCUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fray[1]	WCUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frazee[1]	WDUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frecks[1]	KENT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Freeborn[1]	WDUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Freed[1]	WDUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Freeland[1]	WDUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Freezeout[1]	WFUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frenchton[1]	WFUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fresco[1]	WNAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Friar[1]	KEFN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frio[1]	KEFP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frohna[1]	KEGR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frolona[1]	KEGN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frugality[1]	KEGP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Frumet[1]	KIRJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Fugard[1]	WLEU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Furley[1]	WMAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Furlough[1]	KEKP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gadsden[1]	KITP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gaither[1]	KOJZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gakona[1]	KVOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Galera[1]	KXAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Galewood[1]	KOJX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Galien[1]	KOJT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gardner[1]	KXEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Garza[1]	KVOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gaspar[1]	KVOI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gazette[1]	KIPN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gebhart[1]	KOGV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gedney[1]	KVUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Geneva[1]	KXUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake George[1]	KBEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gera[1]	KOKS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gert[1]	KOMB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Getaway[1]	KOLZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gilboa[1]	KEZJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gilpen[1]	KEZK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Gilta[1]	KEZL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Lake Giltedge[1]	KEBM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Lake Giradeau[1]	KOCS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Girth[1]	KEBN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gitano[1]	KECM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Glasco[4]	KINK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Glebe[1]	KIBB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Glencoe[1]	KIGB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gorin[1]	WRIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gormania[1]	WVIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Govan[1]	WVIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gradan[1]	WSUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grafton[1]	WTUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grainger[1]	KEJK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grama[1]	KEJL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grampian[1]	KEKG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grampus[1]	KEKJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Granby[1]	KIDB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grandon[1]	WLAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Graphite[1]	WZOA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gratis[1]	WZOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grattan[1]	WZOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gravella[1]	WZOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gravett[1]	WZOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gravity[1]	WBUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Greenbrier[1]	WBUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Greenwood[1]	KTOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Gretna[1]	WBUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Grogan[1]	WBUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Harney[1]	KGOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Harris[1]	KXAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Helen[1]	KZOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Hemlock[1]	KLOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Hewes[1]	KVUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Huron[1]	KBAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Lake Inaba[1]	KEFM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lakehurst[1]	KLOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Indian[1]	KZOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Inglenook[1]	KOBT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Lake Janet[1]	KFD	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Jessup[1]	KHV	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Kyttle[1]	WCOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lakeland KBOU[1] ..	KBOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Larga[1]	KMUE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Lasang[1]	KMUA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Ledan[1]	KTUA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Lemandou[1] ..	WCIO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Lesa[1]	KXOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Licking[1] ..	KVUI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Licoco[1]	WTAO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Lida[1]	KLOO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Lillian[1] ..	KXUI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Liliousun[1] ..	KZIO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Linden[1]	KZAE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Louise[1]	KZUU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Marion[1]	KXEE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Markham[1] ..	KTOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Mary[1]	KREO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Mattato[1]	WTAI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Maurepas[1] ..	KLEA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Medford[1] ..	KZOA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Michigan[2] ..	KBOA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Mohonk[4]	WGB	—	Astoria Mahogany Co.	..	..	300, 600	P G ..	X	0.20	—
Lake Monroe[1] ..	KTOE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Narka[1]	KTOA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Onawa[3]	KOJM	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Ogden[1]	KHU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Oneida[4]	WDF	—	Astoria Mahogany Co.	..	..	300, 600	P G ..	X	0.20	—
Lake Ontario[1] ..	KBAA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Orange[1]	KZOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Ormoc[1]	KVUA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Osweya[1] ..	KVAA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Otisco[1]	KLIA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Otsquago[1] ..	KXAO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pachuta[1] ..	KTUU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pearl[1]	KVIO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pepin[1]	KTUI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pewaukee[1] ..	KLEU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pickaway[1] ..	WKAO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Placid[1]	KBOI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Pleasant[1] ..	KXEA	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lakeport WOQ[1] ..	WOQ	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Saba[1]	KOS	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Sanford[1]	KXEI	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Sapor[1]	KEZB	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Savus[1]	KOCB	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Sebago[1]	KLUE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Shawano[1] ..	KLOU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lakeshore[1]	KBAU	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lakeside[1]	KBIO	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lakeside Bridge[1] ..	KONF	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Silver[1]	KHE	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—
Lake Singara[1] ..	KITQ	—	U.S. Shipping Board	..	..	300, 600	P G ..	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Lake Slavi [1]	KOTJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake St. Clair [1]	WNL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Sterling [1]	KBUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Stobi [3]	KISZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Strabo [1]	KEBR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake St. Regis [1]	KLEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Strymon [1]	KONS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Sunapee [1]	KLIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Superior [1]	KBAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Tippah [1]	KOVC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Traverse [1]	KBUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Treba [1]	KOSQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Tulare [1]	WDX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lakeview [1]	KBEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lakeville [1]	KXEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Washburn [1]	KREI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Weir [1]	KBEA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Wilson [1]	KZAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Wimico [1]	KSOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Winona [1]	KLAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Winoaski [1]	KZIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Winthrop [1]	KZAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lakewood KBOO [1]	KBOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Worth [1]	KBIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Yahara [1]	KZAU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Yelverton [1]	KVOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Yamassee [1]	KTOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Ypsilanti [1]	WKEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lake Zaliski [1]	WKAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lampasas [3]	KEP	—	Mallory S.S. Co.	300, 450, **600**	P G	—	—	—	
Lancaster [1]	KQUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Lansdowne [1]	KONP	—	U.S. Shipping Board	300, **600**	P G	N	0.20	—	
Lansing [4]	WTC	—	Union S.S. Co.	300, **600**	P G	—	—	—	
Larimer [5]	KTA	—	Gulf Ref. Co.	300, **600**	P G	—	—	—	
Lassell [1]	KMEA	—	Lassell S.S. Co.	300, **600**	P G	X	0.20	—	
Latoka [1]	WLUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Latouche [4]	WAI	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	

Laurel [1]	WTUE	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lebanon [1]	KIXL	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lehigh [2]	KINM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lenape [3]	KVL	—	Clyde S.S. Co.	300, 450, 600	P G ..	—	—	—
Levi G. Burgess [3] ..	WOX	—	Alaska Portland Packers Assoc...	300, 450, 600	P G ..	X	0.20	—
Levisa [3]	KDL	—	United Fruit Co.	300, 600	P G ..	—	—	—
Lewis K. Thurlow [3] ..	KXY	—	Crowell & Thurlow S.S. Co. ..	300, 450, 600	P G ..	—	—	—
Lewis Luckenbach [4] ..	WFOE	—	Luckenbach S.S. Co.	300, 600	P G ..	X	0.20	—
Lewiston [1]	WSOU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lexington [3]	KNB	—	Colonial Nav. Co.	300, 600	P G ..	—	—	—
Libby Maine [4]	KDV	—	Libby, McNeil & Libby	300, 450, 600	P G ..	—	—	—
Liberator [1]	KRIU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Liberty [4]	WCOO	—	U.S. & Australasia Line	300, 600	P G ..	X	0.20	—
Liberty Glo [1]	KIQZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Liberty Land [1]	KISS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lightburne [1]	KIVF	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Ligonier [2]	KTD	—	Gulf Ref. Co.	300, 600	P G ..	—	—	—
Limon [3]	KDR	—	United Fruit Co.	300, 450, 600	P G ..	—	—	—
Lithopolis [1]	WQEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
L. J. Drake [2]	WZAA	—	Standard Oil Co.	300, 600	P G ..	X	0.20	—
Lockport [1]	KIXM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lone Star [1]	KZUO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lonoke [1]	KPOI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lorain [1]	KIFZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lordship Manor [1] ..	KIXN	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Los Angeles [6]	WOL	—	Union Oil Co.	300, 600	P G ..	X	0.20	—
Louisiana [5]	KUL	—	The Texas Co.	300, 450, 600	P G ..	—	—	—
Louisville [1]	KSL	—	Int. Merc. Mar. Co.	300, 600	P G ..	X	0.20	—
Louisville Bridge [1] ..	KIDP	—	Int. Merc. Mar. Co.	300, 600	P G ..	X	0.20	—
Luella [1]	KLAA	—	Int. Merc. Mar. Co.	300, 600	P G ..	X	0.20	—
Lurline [2]	WML	—	Matson Nav. Co.	300, 450, 600	P G ..	—	—	—
Luxpalile [1]	KIPV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lydia [2]	WROI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lycoming [1]	KOMK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Lyman Stewart [6] ..	WTL	—	Union Oil Co.	300, 600	P G ..	—	—	—
Lynchburg [1]	WFUO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
M. A. Bradley [2] ..	WQH	—	H. H. Brown & Co.	300, 600	P G ..	X	0.20	—
Macomet [1]	KORC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Macona [3]	KFC	—	Barber & Co.	300, 450, 600	P G ..	X	0.20	—
Madison [3]	KOG	—	Old Dominion Line	300, 450, 600	P G ..	—	—	—
Magmeric [4]	KOJS	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Magunkook [1]	WJUO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Mahanna [1]	KKP	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Mahaska [1]	WFAU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Mahnet [1]	KFM	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Maiden Creek [1] ..	KIPX	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Maine KUQ [1]	KUQ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Maine KXD [3]	KXD	—	New England S.S. Co.	300, 550, 600	P G ..	—	—	—
Maitland No. 1 [2] ..	WLE	—	Toronto, Hamilton & Buffalo Nav. Co.	300, 600	P G ..	X	0.20	—
Major Wheeler [1] ..	WFII	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Makanda [1]	KPUA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Malden	KZV	—	New England Fuel & Trans. Co.	300, 450, 600	P G ..	X	0.20	—
Manada [1]	KNOA	—	N.S. Shipping Board	300, 600	P G ..	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Manasses [1]	KILX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Manchuria [5]	WWE	—	Atlantic Transport Co.	300, **600**	P G	X	0.20	—	
Mangore [3]	KHP	—	Oregon S.S. Corp.	300, 450, **600**	P G	—	—	—	
Manham [1]	KORS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Manitou [3]	WFW	—	North Michigan Transport. Co.	300, **600**	P G	X	0.20	—	
Manitowoc [4]	KRQ	—	American Transportation Co.	300, 450, **600**	P G	—	—	—	
Mannahocking [1]	KEZX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Manoa [3]	WMQ	—	Matson Nav. Co.	300, 450, **600**	P G	X	0.20	—	
Manola [1]	WRIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Maquan [1]	KOVD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Maracaibo [3]	KDM	—	Atlantic & Caribbean S.N. Co.	300, 450, **600**	P G	X	0.20	—	
Maratanza [1]	WCEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Margaret KZO [3]	KZO	—	A. H. Bull S.S. Co.	300, **600**	P G	—	—	—	
Margaret WRQ [3]	WRQ	—	Margaret S.S. Co.	300, 450, **600**	P G	—	—	—	
Margus [1]	KONG		U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Mariana [3]	WWZ	—	New York & Porto Rico S.S. Co.	300, 450, **600**	P G	—	—	—	
Marica [4]	KNK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Marina [3]	KIVD	—	Bull-Insular Line	300, **600**	P G	X	0.20	—	
Mariners Harbor [1]	KKEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Marne [1]	KEDJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Marquette & Bessemer No. 2 [3]	WEW	—	Marquette & Bessemer Dock & Nav. Co.	300, **600**	P R	—	—	—	
Marshall [1]	WZUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Marshfield [1]	KECC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Marsodak [4]	KOCM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Maruba [3]	WZEE	—	Inter-Coast S.S. Co.	300, **600**	P G	X	0.20	—	
Maryanne [4]	KFL	—	Maryanne Shipping Co.	300, **600**	P G	—	—	—	
Masca [1]	KIBL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Mascotte [3]	KOW	—	Peninsular & Occidental S.S. Co.	300, **600**	P G	X	0.20	—	
Massick [1]	KOPF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Massillon Bridge [1]	KONJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Masuda [1]	KMII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Matanzas [4]	WFEU	—	New York & Cuba Mail S.S. Co.	300, 450, **600**	P G	—	—	—	
Matinicock [3]	KID	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
Matoa [3]	KMJ	—	Warren Transport Co.	300, **600**	P G	—	—	—	
Matsonia [3]	WMP	—	Matson Nav. Co.	300, 450, **600**	P G	—	—	—	
Mattapan [1]	WCEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Mauban[3]	KRAE	—	Compania de Tabocas del Fillipinas	300, 600	P G	—	—	—
Maui[3]	WMR	—	Matson Nav. Co.	300, 450, 600	P G	—	—	—
Mayport[1]	WTIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mazama[5]	KNUO	—	American S.S. Corp.	300, 600	P G	X	0.20	—
McClellan[1]	KYF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
McCreary County[1]	KOQP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
McKeesport[1]	KEXB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Medford[1]	WRUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Medina[5]	KEI	—	Mallory S.S. Co.	300, 450, 600	P G	—	—	—
Melrose[2]	KZW	—	New England Fuel & Trans. Co.	300, 600	P G	—	—	—
Mendora[1]	KIKN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Menominee[1]	KODL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mercer[1]	KEPF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mercer Victory[1]	KIVG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Meriden[1]	KILP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Merrimack[2]	KQM	—	Merchants & Miners Transport Co.	300, 450, 600	P G	—	—	—
Merry Mount[1]	KOGX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Metapan[3]	KLF	—	United Fruit Co.	300, 600	P G	—	—	—
Mexican[3]	WKL	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
Mexicano[3]	KGM	—	Pierce Oil Co.	300, 600	P G	—	—	—
Mexico[6]	KWX	—	New York & Cuba Mail S.S. Co.	300, 450, 600	P G	—	—	—
Mexoil[3]	WQIA	—	Pan-American Pet. & Trans. Co.	300, 600	P G	—	—	—
Miami[2]	KOZ	—	Peninsular & Occidental S.S. Co.	300, 600	P G	X	0.20	—
Middlebury[1]	KZAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Middlesex[2]	WRO	—	Coastwise Transit Co.	300, 600	P G	X	0.20	—
Mielero[2]	KNT	—	Cuba Distilling Co.	300, 450, 600	P G	—	—	—
Miller County[1]	KERX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Millinocket[3]	KNM	—	A. H. Bull S.S. Co.	300, 600	P G	—	—	—
Milwaukee[2]	KEXS	—	Grand Trunk Car Ferry Line	300, 600	P G	X	0.20	—
Milwaukee Bridge[1]	KIBF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mineola[2]	KSEE	—	Atlantic Pacific S.S. Co.	300, 600	P G	X	0.20	—
Minnequa[1]	KIVB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Minnesota WMI[3]	WMI	—	Inter. Merc. Mar. Co.	300, 600	P G	—	—	—
Minnesota WEK[5]	WEK	—	Atlantic Transport Co.	300, 600	P G	X	0.20	—
Minnesotan[3]	WKM	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
Minnewawa[1]	KOPG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Missouri[2]	WFX	—	North Michigan Transport Co.	300, 600	P G	X	0.20	—
Mitchell[1]	KOTF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
M. J. Scanlon[1]	WJAO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Moccasin[1]	WJG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mohawk KVM[2]	KVM	—	Clyde S.S. Co.	300, 450, 600	P G	—	—	—
Mohawk KXE[3]	KXE	—	New England S.S. Co.	300, 550, 600	P G	—	—	—
Mohawk KYU[3]	KYU	—	R. E. Barry	300	P R	—	—	—
Mohegan[3]	KXM	—	New England S.S. Co.	300, 550, 600	P G	—	—	—
Mojave[1]	WJEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Moldegaard[3]	KNR	—	Bull Insular S.S. Co.	300, 600	P G	—	—	—
Moline[1]	KEXN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Momus[3]	KKM	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
Monana[1]	KFEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mongolia[1]	WWN	—	Atlantic Transport Co.	300, 600	P G	X	0.20	—
Monmouth[1]	WXUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Mono[1]	WBOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Monomac[1]	KORP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Monroe[1]	KOSF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Montague [1]	KOMV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Montclair [1]	KVII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Monterey [5]	KWY	—	New York & Cuba Mail S.S. Co.	300, 450, **600**	P G	—	—	—	
Montezuma [1]	KSUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Montgomery [1]	KIJP		U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Monticello [1]	WLJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Montoso [2]	WKY	—	New York & Porto Rico S.S. Co.	300, 450, **600**	P G	X	0.20	—	
Montpelier [4]	WLZ	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Montrolite [2]	WEQ	—	Standard Oil Co.	300, **600**	P G	X	0.20	—	
Moonlite [2]	KPL	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	X	0.20	—	
Moosabee [5]	KIKP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Moosehausic [1]	KOGD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Moositauke [1]	KOKG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Mopang [1]	KOPX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Moraine [1]	KPEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Morganza [1]	KEGB	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Moritz [1]	KPEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Morristown [1]	WGAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Morro Castle [5]	KWC	—	New York & Cuba Mail S.S. Co.	300, 450, **600**	P G	—	—	—	
Moss Point [1]	KETJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20		
Mount Baker [2]	KYD	—	G.W. & W.S.S. Corporation	300, **600**	P G	X	0.20	—	
Mount Evans [1]	KIMT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Mount Hope [3]	KOL	—	P.F.R. & N.S. Co.	300	P	—	—	—	
Mount Rainier [2]	WSOE	—	G.W. & W.S.S. Corporation	300, **600**	P G	—	—	—	
Mount Shasta [1]	WHH	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Mount Vernon Bridge [1]	KWA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Mulpua [1]	KIDJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Multnomah [2]	WMA	—	Multnomah S.S. Co.	300, **600**	P G	X	0.20	—	
Munaires [2]	WJN	—	Munson S.S. Lines	300, **600**	P G	—	—	—	
Munalbro [2]	KUX	—	Munson S.S. Lines	300, 450, **600**	P G	—	—	—	
Munamar [2]	KUI	—	Munson S.S. Lines	300, **600**	P G	—	—	—	
Mundale [2]	KUJ	—	Munson S.S. Lines	300, 450, **600**	P G	—	—	—	
Mundelta [2]	KUF	—	Munson S.S. Lines	300, **600**	P G	—	—	—	
Munindies [2]	KVE	—	Munson S.S. Lines	300, **600**	P G	—	—	—	
Munplace [2]	KUG	—	Munson S.S. Lines	300, 450, **600**	P G	—	—	—	
Munra [1]	WDAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Munrio [2]	KVD		Munson S.S. Lines	300, 450, **600**	P G	—	—	—	

Munsomo[2]	KUK	—	Munson S.S. Lines	300, 450, 600	P G	—	—	—
Munwood[3]	KUH	—	Munson S.S. Lines	300, 600	P G	—	—	—
Muscatine[1]	KJII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Musketo[1]	WDAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Muskogee[3]	KIB	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Mystery[3]	KYZ	—	Lucy W. Hewitt	300, 600	P	—	—	—
Mystic[6]	KHZ	—	Shawmut S.S. Co.	300, 600	P G	X	0.20	—
Nacogdoches[1]	KKIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nacoochee[3]	KFP	—	Ocean S.S. Co.	300, 450, 600	P G	—	—	—
Naiwa[1]	WCIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nameaug[1]	KITN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Namecki[1]	WFAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nanking[2]	KKEE	—	China Mail S.S. Co.	300, 600	P G	—	—	—
Nansemond[1]	WQR	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Nantahala[1]	WGIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nantasket[1]	WLIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nantucket[2]	KQN	—	Merchants & Miners Transport Co.	300, 450, 600	P G	—	—	—
Nashotah[1]	WBOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Natenna[3]	KICL	—	National S.B. Co.	300, 600	P G	X	0.20	—
National Bridge[1]	KIBG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Navahoe[3]	KOR	—	Trans-Oceanic S.S. Co.	300, 450, 600	P G	X	0.20	—
Nawitka[2]	KELZ	—	Nacirema S.S. Co.	300, 600	P G	X	0.20	—
Neabsco[6]	KEKV	—	Nacirema S.S. Corporation	300, 600	P G	X	0.20	—
Nedmac[1]	KIQM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Neeolah[1]	WLOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nehalem[3]	KEBC	—	Pacific Mercantile Marine Co.	300, 600	P G	—	—	—
Nelson[3]	KNL	—	Cuba Distilling Co.	300, 450, 600	P G	—	—	—
Nemassa[1]	KEQL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Neponset[1]	WQIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Neptune[3]	KORZ	—	Mexican Fruit & S.S. Co.	—	P G	—	—	—
Neptun[1]	KUN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nesco[1]	KEBT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Neshaminy[1]	KILN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Neuse[1]	WLT	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
New Britain[3]	KIRG	—	Great Northwestern Shipping Corporation	300, 600	P G	X	0.20	—
Newburgh[1]	WZUE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
New Haven[3]	KXN	—	New England S.S. Co.	300, 600	P G	—	—	—
New Hampshire[3]	KXF	—	New England S.S. Co.	300, 600	P G	—	—	—
Newport[6]	WWH	—	Pacific Mail S.S. Co.	300, 600	P G	—	—	—
Newton KIRC[1]	KIRC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Newton KZX[3]	KZX	—	New England Fuel & Transport Co.	300, 450, 600	P G	—	—	—
New Windsor[1]	KGAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
New York[5]	KUW	—	The Texas Co.	300, 450, 600	P G	—	—	—
Nika[5]	KOPM	—	Hodge S.S. Co.	300, 600	P G	X	0.20	—
Nile[5]	KOSD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nipmuc[1]	KOQX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nipsic[1]	KCOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nishmaha[5]	KEVM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nobles[1]	KODB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Noccalula[1]	KORF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nockum[1]	KOGU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Nokatay[1]	KOCF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Noma[3]	KYO	—	Vincent Astor	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Nonantum[1]	KIXP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Norfolk[2]	WZUA	—	Coast Tr. Co.	300, **600**	P G	X	0.20	—	
Norlina[2]	KJE	—	Garland S.S. Corporation	300, **600**	P G	X	0.20	—	
Norma[1]	KEKC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Norman Bridge[2]	WIG	—	P.A. Pet. & Transit Co.	300, 450, **600**	P G	—	—	—	
North American[2]	WEN	—	Chicago, Duluth & Georgian Bay Transit Co.	300, **600**	P G	X	0.20	—	
Northbend[1]	WPB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
North Land[2]	KJD	—	Eastern S.S. Lines	300, **600**	P G	X	0.20	—	
Northland WGJ[4]	WGJ	—	Albers Bros. Milling Co.	300, 450, **600**	P G	—	—	—	
North Pines[2]	WZEU	—	North Pines S.S. Co.	300, **600**	P G	X	0.20	—	
North Poles[1]	KELB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Northwestern KUO[5]	KUO	—	The Texas Co.	300, 450, **600**	P G	—	—	—	
Northwestern WAN[4]	WAN	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Northwestern Bridge[1]	KONK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
North Wind[2]	KYB	—	C. M. Clark	300	P	—	—	—	
Norwood[4]	WSG	—	Pacific American Fisheries	300, 450, **600**	P G	—	—	—	
Nosciuszko[1]	KZUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Noshico[1]	KOBX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Nueces[2]	KEH	—	Mallory S.S. Co.	300, **600**	P G	—	—	—	
Nupolela[1]	WLOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Nushagak[2]	WNE	—	Alaska Packers' Association	300, 450, **600**	P G	—	—	—	
Nuuanu[2]	WWT	—	General Petroleum Corporation	300, **600**	P G	X	0.20	—	
Nyanza[1]	WJO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
O. A. Hermanson[2]	WRA	—	Standard Oil & Trans. Corporation	300, **600**	P G	—	—	—	
Oakland[1]	KMOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Oakley C. Curtis[2]	KQL	—	France-Canadian S.S. Corp.	300, 450, **600**	P G	X	0.20	—	
Oback[1]	KELV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ocean Traffic[2]	KOLP	—	Madrigal & Co.	300, **600**	P G	—	0.20	—	
Ocone[1]	KJC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Octorara WCD[2]	WCD	—	Great Lakes Transit Corporation	300, **600**	P G	X	0.40	—	
Octorara KRIO[1]	KRIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Oglethorpe[1]	WZUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ogontz[1]	KINB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ohioan[2]	WKQ	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—	
Okesa[1]	WXEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Okiya[1]	WRUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Olean [2]	KRR	—	Vacuum Oil Co.	300, 450, **600**	P G	X	0.20	—
Olen [1]	KINR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oleum [5]	WTD	—	Union Oil Co.	300, **600**	P G	—	—	—
Olockson [4]	KOFB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oneco [1]	KZUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oneida [3]	KYP	—	E. C. Benedict	300, **600**	P	—	—	—
Onekama [1]	KEDK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oneonta [3]	WPX	—	Port of Portland	300, 450, **600**	P G	—	—	—
Ontario [2]	KQO	—	Merchants & Miners Transport Co.	300, 450, **600**	P G	—	—	—
Opelika [1]	KECL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Opequan [1]	KIBK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Ophis [1]	KODZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Orani [1]	KOBD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oraton [1]	KEMR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Orcus [2]	KISC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oregon WGD [2]	WGD	—	Pacific Nav. Co.	300, **600**	P G	X	0.20	—
Oregon WOC [2]	WOC	—	Henry Wilson	300, 450, **600**	P G	X	0.20	—
Oregon WOU [2]	WOU	—	Crowley Launch & Tugb. Co.	300, **600**	P	X	0.20	—
Oregonian [3]	WKO	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Orient [1]	KOIC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Orion [1]	WLO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Orizaba [1]	KMEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Orleans [2]	KIDZ	—	Orleans S.S. Corp.	300, **600**	P G	X	0.20	—
Osage [1]	WJU	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—
Osakis [1]	WFOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Osaqumsick [1]	KEVN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Osawatomie [1]	KEVB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oscoda [1]	KEKT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oshkosh [1]	WFUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oskaloosa [1]	WJII	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Oskawa [1]	WGUA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Ossineke [1]	WTW	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Ossinging [1]	KEFR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Otsego [1]	WDG	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—
Otto M. Reiss [2]	WNG	—	Reiss S.S. Co.	300, 450, **600**	P G	X	0.20	—
O. T. Waring [3]	KJW	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—
Overbrook [1]	KLAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Owatama [1]	WMOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Owego [2]	KFQ	—	Federal S.S. Co.	300, 450, **600**	P G	—	—	—
Oyaka [5]	KELX	—	States S.S. Corp.	300, **600**	P G	X	0.20	—
Ozama [1]	WRX	—	A.G. & W.I. S.S. Co.	300, **600**	P G	X	0.20	—
Ozaukee [1]	WXAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Ozette [1]	KEVP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Palisades [1]	KOLV	—	U.S. Shipping Board	300, **600**	P G	N	0.20	—
Panama [3]	KMH	—	Panama Railroad Co.	300, 450, **600**	P G	—	—	—
Panaman [3]	WKR	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—
Pan American [2]	KUT	—	Texas S.S. Co.	300, 450, **600**	P G	X	0.20	—
Panay [3]	KEMJ	—	Madrigal & Co.	300, **600**	P G	—	—	—
Panga [1]	WJEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Panola [1]	WMUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—
Panuco KMM [2]	KMM	—	Sinclair Gulf Corp.	300, **600**	P G	X	0.20	—
Panuco KWM [5]	KWM	—	Atlantic Gulf & W.I. S.S. Lines	300, 450, **600**	P G	—	—	—
Paraguay [2]	KTT	—	Sun Co.	300, **600**	P G	—	—	—
Paraiso [6]	WRI	—	Oliver J. Oliver	300, **600**	P G	—	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Parismina [3]	KDG	—	United Fruit Co.	300, **600**	P G	—	—	—	
Parksville [1]	KIZG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Parthian [1]	WCE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pasadena [1]	KMEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pascagoula [1]	WBIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Passaic Bridge [1]	KIBJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pastores [3]	KLA	—	United Fruit Co.	300, **600**	P G	—	—	—	
Pathfinder [2]	KGY	—	David Weidner	300, 450, **600**	P G	—	—	—	
Patrol [3]	KIN	—	City of New York	300, 450, **600**	P	—	—	—	
Paul H. Harwood [2]	KJIO	—	P.A. Pet. & Tr. Co.	300, **600**	P G	—	—	—	
Paulsboro [2]	KRS	—	Vacuum Oil Co.	300, 450, **600**	P G	—	—	—	
Pawnee [1]	WLU	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Pawtucket [1]	KINZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pearl Shell [3]	WIC	—	Shell S.S. Co.	300, 450, **600**	P G	—	—	—	
Peekskill [1]	KOMX	—	U.S. Shipping Board	300, **600**	P G	N	0.20	—	
Pelican [1]	KIRL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Penguin [1]	KOMJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pennant [2]	KME	—	Pierce Oil Corporation	300, 450, **600**	P G	—	—	—	
Pennsylvania [3]	KUP	—	Texas S.S. Co.	300, 450, **600**	P G	—	—	—	
Pennsylvanian [3]	WKP	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—	
Pequonnock [3]	KXP	—	New England S.S. Co.	300, 550, **600**	P G	—	—	—	
Pequot [2]	WLX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pere Marquette [2]	WDA	—	Pere Marquette Railroad Co.	300, 500, **600**	P R	X	0.20	—	
Pere Marquette 8 [2]	KINL	—	Chicago & S. Haven S.S. Co.	—	—	—	—	—	
Pere Marquette No. 17 [2]	WDC	—	Pere Marquette Railroad Co.	300, 500, **600**	P R	X	0.20	—	
Pere Marquette No. 18 [2]	WDD	—	Pere Marquette Railroad Co.	300, 450, **600**	P R	X	0.20	—	
Pere Marquette No. 19 [2]	WDB	—	Pere Marquette Railroad Co.	300, 500, **600**	P R	X	0.20	—	
Pere Marquette No. 20 [2]	WDE	—	Pere Marquette Railroad Co.	300, 500, **600**	P R	X	0.20	—	
Perfection [2]	KTN	—	Standard Oil Co. of New York	300, 450, **600**	P G	X	0.20	—	
Persian [2]	KQX	—	Merchants & Miners Transport Co.	300, 450, **600**	P G	—	—	—	
Peter H. Crowell [1]	KEXT	—	Crowell & Thurlow	300, **600**	P G	X	0.20	—	
Peter Reiss [2]	WNX	—	North American S.S. Co.	300, **600**	P G	X	0.20	—	
Petoskey [2]	WDH	—	Chicago & South Haven S.S. Co.	300, **600**	P G	X	0.20	—	
Petuma [1]	KOQN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Pezuta [1]	KPIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Philadelphia KDA [2]	KDA	—	Atlantic & Caribbean S.N. Co.	300, 450, **600**	P G	X	0.20	—	
Philadelphia KSM [1]	KSM	—	Int. Merc. Mar. Co.	300, **600**	P G	X	0.20	—	

Philippines[1]	WAV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Phœnix[1]	WJEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Phœnix Bridge[1]	WFOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Phyllis[3]	KEA	—	Phyllis S.S. Co.	300, 600	P G	—	—	—	
Pioneer KIG[2]	KIG	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—	
Pioneer WPN[3]	WPN	—	P.S. Tugboat Co.	300, 600	P G	—	—	—	
Pipestone County[1]	KIMZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Piqua[1]	KMEE	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—	
Pisco[1]	KEQV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Plainfield[1]	WJEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Pleiades[4]	WNP	—	Luckenbach S.S. Co.	300, 600	P G	X	0.20	—	
Plymouth KXH[2]	KXH	—	Green Star S.S. Co.	300, 550, 600	P G	X	0.20	—	
Plymouth KND[2]	KND	—	Nafra Co.	300, 450, 600	P G	—	—	—	
Point Adams[1]	WES	—	Pacific Mail S.S. Co.	300, 600	P G	X	0.20	—	
Point Arena[1]	WHP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Point Bonita[1]	WMT	—	Pacific Mail S.S. Co.	300, 600	P G	X	0.20	—	
Point Judith[1]	KPAA	—	Pacific Mail S.S. Co.	300, 600	P G	X	0.20	—	
Point Lobos[1]	KJUI	—	Pacific Mail S.S. Co.	300, 600	P G	X	0.20	—	
Point Loma[1]	WAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Polar Bear[1]	WGOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Polarine[2]	KOI	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—	
Polar Sea[1]	KSOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Polar Star[1]	KELC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Polias[1]	KODM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Polybius[1]	KIGL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Ponce[2]	KGP	—	New York & Porto Rico S.S. Co.	300, 450, 600	P G	—	—	—	
Pontchartrain[1]	KIMP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Pontia[1]	KIPC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Portsmouth[4]	KOJV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Poughkeepsie[1]	KEZZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
President[2]	WGP	—	Pacific S.S. Co.	300, 600	P G	X	0.20	—	
Princess Anne[3]	KOB	—	Old Dominion Line	300, 450, 600	P G	—	—	—	
Princess Matoika[1]	WLS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Princeton[2]	KST	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—	
Priscilla[3]	KXI	—	New England S.S. Co.	300, 550, 600	P G	—	—	—	
Proctor[1]	KEPQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Providence[3]	KXJ	—	New England S.S. Co.	300, 550, 600	P G	—	—	—	
Providencia[2]	WIK	—	Providencia S.S. Co.	300, 450, 600	P G	X	0.20	—	
Prusa[1]	KELQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Puget Sound[1]	WER	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Puritan[3]	WDU	—	Graham & Morton Trans. Co.	300, 600	P G	—	—	—	
Putnam[1]	KIXQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Puyallup[1]	KEXC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Pyramus[1]	KIPL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Python[1]	WNIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Quantico[2]	KQO	—	Merchants & Miners Transport Co.	300, 450, 600	P G	—	—	—	
Quapaw[1]	KETC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Queen[2]	WGX	—	Pacific S.S. Co.	300, 450, 600	P G	X	0.20	—	
Queen II[3]	WOY	—	C.I.P.S. Co.	400	P	—	—	—	
Quemakoning[1]	KETD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Quidnic[1]	KSEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Quinault[1]	KNEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Quinneseco[1]	WRIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	
Quinnipiac[1]	KOQT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—	

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radiotelegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Quistconck [1]	WREI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Quitticas [1]	WRUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Quoque [1]	KPOE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Radiant [2]	KTR	—	Standard Oil Co. of New York	300, 450, **600**	P G	X	0.20	—	
Radnor [1]	KJUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Rainier [4]	WRZ	—	Albers Bros. Milling Co.	300, 450, **600**	P G	—	—	—	
Rajah [1]	WAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Rama [3]	KRX	—	Rama Nav. Co.	300, 450, **600**	P G	—	—	—	
Randolph S. Warner [1]	WZEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ransom B. Fuller [2]	KRF	—	Eastern S.S. Lines	300, **600**	P G	X	0.20	—	
Rapidan [2]	KOSG	—	U.S. Shipping Board	300, **600**	P G	N	0.20	—	
Rappahannock [1]	WQQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Rayo [5]	KTL	—	Standard Oil Co. of New York	300, **600**	P G	—	—	—	
Rebecca Palmer [1]	WQEI	—	S. de Barrenechea	300 **600**	P G	X	0.20	—	
Red Cloud [2]	WJEE	—	French-Amer. Line	300, **600**	P G	X	0.20	—	
Redlands [1]	WDUE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Red Mountain [1]	KOTQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Redondo KYT [5]	KYT	—	Redondo S.S. Co.	300, **600**	P G	X	0.20	—	
Redondo WBM [4]	WBM	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Redwood [4]	WSD	—	Pacific American Fish Co.	300, 450, **600**	P G	—	—	—	
Relay [3]	KVZ	—	Mexican Tel. Co.	300, **600**	P	—	—	—	
Relief [4]	KRJ	—	M. & C.D. & W. Co.	300, 450, **600**	P G	—	—	—	
Remlik [3]	KZR	—	W. S. Kilmer	300, **600**	P G	—	—	—	
Remus [1]	KEBX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Republic [2]	WSU	—	Chile S.S. Co. (Inc.)	300, **600**	P G	X	0.20	—	
Rescue [4]	KRP	—	M. & C.D. & W. Co.	300, 450, **600**	P G	—	—	—	
Resolute [3]	KRM	—	M. & C.D. & W. Co.	300, **600**	P G	—	—	—	
Restorer [2]	WIU	—	Com. Pac. Cable Co.	300, 450, **600**	P	X	0.20	—	
Reuce [3]	WSR	—	C.R.P.A.	300, 525, **600**	P G	—	—	—	
Richard J. Reiss [2]	WNK	—	Reiss S.S. Co.	300, **600**	P G	X	0.20	—	
Richard Peck [3]	KXR	—	N.E. S.S. Co.	300, 450, **600**	P G	—	—	—	
Richmond [2]	WTR	—	Standard Oil Co. of California	300, **600**	P G	X	0.20	—	
Richmond Boro [2]	KITX	—	Williams S.S. Co.	300, **600**	P G	X	0.20	—	
Rio Grande [3]	KEG	—	Mallory S.S. Co.	300, **600**	P G	—	—	—	
Robert M. Thompson [3]	KNW	—	Amer. Transportation Co.	300, **600**	P G	—	—	—	
Robert P. Clark [3]	KTH	—	Gulf Refining Co.	300, **600**	P G	—	—	—	

Robin Hood[1]	KOTM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Rockaway Park[1]	KIZZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Rock Island[1]	KIND	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Rock Island Bridge[1]	KORN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Roman[2]	WRII	—	French-Amer. Line	300, 600	P G	X	0.20	—
Romulus[1]	KIDR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Rose City[2]	WWR	—	S.F. & P.S.S. Co.	300, 600	P G	X	0.20	—
Rose Mahony[1]	KSAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Royal Arrow[2]	KSW	—	Standard Transit Co.	300, 450, 600	P G	—	—	—
Roy Hoober[2]	WCQ	—	Sinclair Nav. Co.	300, 600	P G	X	0.20	—
Ruby[1]	KOBC	—	American Transportation Co.	300, 600	P G	X	0.20	—
Rush[3]	WNR	—	Bering Sea Packing Co.	300, 600	P G	—	—	—
Ruth[3]	KZQ	—	A. H. Bull S.S. Co.	300, 600	P G	—	—	—
Ruth E. Merrill[2]	KQU	—	Olympia Shipping Corp.	300, 450, 600	P G	X	0.20	—
Sabine[5]	KEB	—	Mallory S.S. Co.	300, 450, 600	P G	—	—	—
Sabine Sun[2]	WLQ	—	Sun Co.	300, 600	P G	—	—	—
Sabotawan[1]	KIJJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sacandaga[1]	KESC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Saccarappa[1]	WGOI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sac City[1]	KEFB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sachem[1]	WQU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Saco[1]	KEPT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sacram-nto[2]	KWV	—	Sacramento S.S. Co.	300, 600	P G	X	0.20	—
Sagadahoc[1]	KTUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sagaporack[1]	KZIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sag Harbor[1]	WPAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sagua[5]	KVO	—	Atlantic Fruit Co.	300, 450, 600	P G	—	—	—
Saguache[1]	KEKL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sahale[1]	KEPR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Salaverry[1]	KEQX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Salem County[2]	KODR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Salmon[1]	KPOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Saluda[1]	KEGQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Salvation Lass[1]	KIMN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Samuel Faunce[2]	KQV	—	France-Canada S.S. Co.	300, 600	P G	X	0.20	—
Samuel Mitchell[2]	WEJ	—	Huron Transport Co.	400, 450, 600	P G	X	0.20	—
San Antonio[3]	KOMN	—	Adolfo Stahl	—	—	—	—	—
Sangamon[1]	WJAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
San Jacinto[5]	KES	—	Mallory S.S. Co.	300, 450, 600	P G	—	—	—
San Jose KDJ[2]	KDJ	—	United Fruit Co.	300, 450, 600	P G	—	—	—
San Jose WWL[6]	WWL	—	Pacific Mail S.S. Co.	300, 600	P G	—	—	—
San Juan KGJ[2]	KGJ	—	N.Y. & P.R. S.S. Co.	300, 450, 600	P G	—	—	—
San Juan WWM[6]	WWM	—	Pacific Mail S.S. Co.	300, 600	P G	—	—	—
San Marcos[1]	KEK	—	Mallory S.S. Co.	300, 600	P G	X	0.20	—
San Mateo[3]	KLV	—	United Fruit Co.	300, 600	P G	—	—	—
San Ramon[2]	WNW	—	San Ramon S.S. Co.	300, 600	P G	X	0.20	—
Santa Alicia[2]	WSJ	—	Grace S.S. Co.	300, 450, 600	P G	—	—	—
Santa Ana WAL[4]	WAL	—	Alaska S.S. Co.	300, 600	P G	—	—	—
Santa Ana WBX[2]	WBX	—	Grace S.S. Co.	300, 450, 600	P G	—	—	—
Santa Barbara[2]	WBJ	—	Grace S.S. Co.	300, 450, 600	P G	—	—	—
Santa Cecilia[2]	WBB	—	Nafra Co. (Inc.)	300, 600	P G	—	—	—
Santa Clara[2]	WBA	—	Atlantic & Pacific S.S. Co.	300, 600	P G	—	—	—
Santa Cruz[2]	WBD	—	Atlantic & Pacific S.S. Co.	300, 600	P G	X	0.20	—
Santa Elena[2]	WBZ	—	Grace S.S. Co.	300, 450, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
Santa Elisa [1]	KIGQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Santa Flavia [3]	KRUI	—	Grace S.S. Co.	300, **600**	P G	—	—	—	
Santa Inez [3]	WSI	—	Grace S.S. Co.	300, **600**	P G	—	—	—	
Santa Isabel [3]	WHN	—	Grace S.S. Co.	300, **600**	P G	—	—	—	
Santa Leonora [1]	KIML	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Santa Luisa [3]	KJEU	—	Grace S.S. Co.	300, 450, **600**	P G	—	—	—	
Santa Malta [3]	KIBN	—	Atlantic & Pacific S.S. Co.	300, **600**	P G	—	—	—	
Santa Marta [3]	KLG	—	United Fruit Co.	300, **600**	P G	—	—	—	
Santanta [3]	KZS	—	Osbornes Howes	300, **600**	P	—	—	—	
Santa Olivia [3]	KQII	—	Atlantic & Pacific S.S. Co.	300, **600**	P G	—	—	—	
Santa Paula [3]	WBQ	—	Grace S.S. Co.	300, 450, **600**	P G	—	—	—	
Santa Rita WBR [2]	WBR	—	Grace S.S. Co.	300, 450, **600**	P G	—	—	—	
Santa Rita WTG [2]	WTG	—	Sun Company	300, **600**	P G	—	—	—	
Santa Rosa [3]	WBO	—	Grace S.S. Co.	300, 450, **600**	P G	—	—	—	
Santa Rosalia [2]	KLO	—	U.S. Steel Products Co.	300, **600**	P G	X	0.20	—	
Santa Tecla [3]	KNEE	—	Grace S.S. Co.	300, **600**	P G	—	—	—	
Santa Teresa [1]	WLIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Santiago [5]	KWE	—	N.Y. & C.M. S.S. Co.	300, 450, **600**	P G	—	—	—	
Santino [3]	KRY	—	G.W. & W.S.S. Corp.	300, 450, **600**	P G	X	0.20	—	
Santore [3]	KDQ	—	Oregon S.S. Corp.	300, **600**	P G	—	—	—	
San Turce [3]	KEMV	—	N.Y. & P.R. S.S. Co.	300, **600**	P G	—	—	—	
Sapinero [1]	KESG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Sapona [1]	KOSP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Sarah Weems [3]	WQJ	—	Balto. & Car. S.S. Co.	300, **600**	P G	—	—	—	
Saramacca [3]	KLH	—	United Fruit Co.	300, **600**	P G	—	—	—	
Sarcoxie [1]	WLAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Saris [1]	WGIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Satartia [1]	KIDC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Satsuma [3]	KJI	—	Barber & Co. Inc.	300, **600**	P G	—	—	—	
Saucon [1]	WBK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Saugerties [1]	WAB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Saugus [1]	KIBQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Saxon [1]	WZEA	—	Clinchfield Nav. Co.	300, **600**	P G	X	0.20	—	
S. B. Hunt [3]	KIPR	—	Standard Oil Co. of New Jersey	300, **600**	P G	X	0.20	—	
Scantic [1]	KILR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Schenectady [1]	WJIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Schodack [1]	KEVT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Schoharie [1]	KEVV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Schoodic [1]	KIDQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Schroon [1]	KIJM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Scottsburg [1]	KOMM	—	U.S. Shipping Board	300, 600	P G	N	0.20	—
Sea Bird [2]	KICT	—	Sea Bird Co.	300, 600	P G	—	—	—
Seafarer [3]	WPL	—	Seafarer Nav. & Sal. Co.	300, 600	P R	—	—	—
Seattle Spirit [1]	KISD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Security [2]	KSJ	—	Standard Trans. Co.	300, 600	P G	X	0.20	—
Seeanbee [2]	WFS	—	Cleveland & Buffalo Transit Co.	300, 600	P G	X	0.20	—
Seekonk [1]	KIGF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Seguranca [2]	KWG	—	Standard Com. S.S. Corp.	300, 600	P G	X	0.20	—
Senator [2]	WGS	—	Pacific S.S. Co.	300, 600	P G	X	0.20	—
Senator Bailey [2]	KGS	—	Gulf Refining Co.	300, 450, 600	P G	X	0.20	—
Severance [4]	KXOE	—	Union Sulphur Co.	300, 600	P G	—	—	—
Sewalls Point [1]	KGX	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Sewickley [1]	KPII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Seypen [1]	WGEU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shannock [1]	KOBB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sharon [1]	KIRK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shaume [1]	KILQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shenandoah [1]	KIBD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shenango [2]	KTC	—	Gulf Refining Co.	300, 600	P G	X	0.20	—
Sherman [2]	KMQ	—	Sherman S.S. Co.	300, 450, 600	P G	X	0.20	—
Shickshinny [1]	KIZP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shooters Island [1]	KERG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shootsville [1]	KIKK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Shoshone [2]	KOQ	—	American Inter-Lake Co.	300, 600	P G	—	—	—
Siboney [1]	WRN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sierra WHJ [6]	WHJ	—	Oceanic S.S. Co.	300, 600	P G	—	—	—
Sierra KRW [2]	KRW	—	E. K. Wood Lumber Co.	300, 450, 600	P R	X	0.20	—
Siletz [5]	KODG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Silverado [1]	WRC	—	U.S. Shipping Board	300, 476, 600	P G	X	0.20	—
Silverbrook [1]	KIBC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Silver Shell [2]	WIA	—	Silver Shell S.S. Co.	300, 450, 600	P G	—	—	—
Singleton Palmer [2]	KPV	—	France-Canada S.S. Corp.	300, 450, 600	P G	X	0.20	—
Sinsinawa [1]	KOJD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sioux Falls [1]	KONN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sir Thomas Shaughnessy [2]	WFV	—	Jenkins S.S. Co.	300, 450, 600	P G	X	0.20	—
Sir Trevor Dawson [3]	WMIU	—	Canada S.S. Lines	300, 600	P G	—	—	—
Sixaola [3]	KDS	—	United Fruit Co.	300, 600	P G	—	—	—
Skagway [3]	WAT	—	Alaska S.S. Co.	300, 600	P G	—	—	—
S. M. Fischer [2]	WPH	—	Reid Tow & Wrk. Co.	300, 600	P G	X	0.20	—
S. M. Spalding [2]	WKG	—	P.A. Pet. & Transit Co.	300, 600	P G	—	—	—
Snug Harbor [2]	WBAA	—	Coastwise Transit Co.	300, 450, 600	P G	X	0.20	—
Socony [5]	KTX	—	Standard Oil Co. of New York	300, 600	P G	—	—	—
Socony 82 [2]	KVAI	—	Standard Oil Co. of New York	300, 450, 600	P G	X	0.20	—
Socony 83 [2]	KVAO	—	Standard Oil Co. of New York	300, 450, 600	P G	X	0.20	—
Socony 84 [2]	WCOE	—	Standard Oil Co. of New York	300, 600	P G	X	0.20	—
Socony 85 [2]	WKAE	—	Standard Oil Co. of New York	300, 450, 600	P G	X	0.20	—
Socony 88 [2]	KRUU	—	Standard Oil Co. of New York	300, 450, 600	P G	X	0.20	—
Socony 89 [2]	KSAA	—	Standard Oil Co. of New York	300, 600	P G	X	0.20	—
Socony 90 [2]	WTII	—	Standard Oil Co. of New York	300, 600	P G	X	0.20	—
S. O. Co. No. 91 [2]	WTU	—	Standard Oil Co. of California	300, 600	P G	X	0.20	—
Socony 92 [2]	WCOI	—	Standard Oil Co. of New York	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
S. O. Co. No. 93[3] ..	WTY	—	Standard Oil Co. of California ..	300, **600**	P G ..	X	0.20	—	
Socony 94[3]	WTIO	—	Standard Oil Co. of New York ..	300, **600**	P G ..	X	0.20	—	
S. O. Co. No. 95[3] ..	WTZ	—	Standard Oil Co. of California ..	300, **600**	P G ..	X	0.20	—	
Sol Navis[4]	KIGS	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Somerset[3]	KSU	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G ..	—	—	—	
Sonoma[4]	WHM	—	Oceanic S.S. Co.	300, **600**	P G ..	—	—	—	
South American[3] ..	WEO	—	C.D. & G.B. S.S. Co.	300, **600**	P G ..	X	0.20	—	
South Bend[4]	KEXQ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
South Pole[1]	WDIA	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Speedwell[3]	KLZ	—	Freiberg Lumber Co.	300, **600**	P G ..	—	—	—	
Spokane[3]	WGE	—	Pacific S.S. Co.	300, **600**	P G ..	X	0.20	—	
Stadacona[3]	WMIO	—	Canada S.S. Lines..	300, **600**	P G ..	X	0.20	—	
Standard KIC[3] ..	KIC	—	Standard Oil Co. of New Jersey..	300, 450, **600**	P G ..	—	—	—	
Standard KXOI[3] ..	KXOI	—	Standard Transportation Co. ..	300, 450, **600**	P G ..	X	0.20	—	
Standard II.[3]	KSA	—	Standard Transportation Co. ..	300, **600**	P G ..	X	0.20	—	
Standard Arrow[3] ..	KSV	—	Standard Transportation Co. ..	300, 450, **600**	P G ..	—	—	—	
Stanley[1]	KISJ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Stanley Dollar[4] ..	WHS	—	Dollar S.S. Line	300, **600**	P G ..	—	—	—	
Stanwood[3]	KHD	—	Stanwood S.S. Co...	300, **600**	P G ..	—	—	—	
Starlite[3]	KPK	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G ..	X	0.20	—	
Star of Greenland[3] ..	KERF	—	Alaska Packers Association ..	300, **600**	P G ..	—	—	—	
Star of Lapland[3] ..	KXOA	—	Alaska Packers Association ..	300, **600**	P G ..	—	—	—	
Star 1[3]	WRIO	—	U.S. Whaling Co.	300, **600**	P G ..	—	—	—	
Starr[4]	WPS	—	San Jaun Fish. & Pack. Co. ..	300, **600**	P G ..	—	—	—	
State of Ohio[3] ..	WFR	—	Cleveland & Buffalo Transit Co.	300, **600**	P G ..	X	0.20	—	
St. Augustine[1].. ..	KIKJ	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
St. Charles[3]	KOK	—	Maru Nav. Co.	300, **600**	P G ..	X	0.20	—	
Steadfast[1]	WDEO	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Stephen R. Jones[3] ..	KXX	—	Crowell & Thurlow	300, **600**	P G ..	—	—	—	
St. Francis[3]	KRT	—	U.S. Steel Products Co. ..	300, **600**	P G ..	X	0.20	—	
St. John's County[1] ..	KIKG	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
St. Nicholas[3]	WSS	—	Col. Rev. Pac. Association ..	300, **600**	P G ..	—	—	—	
Storm King[1]	KOGM	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
St. Paul[3]	KSO	—	Int. Mer. Mar. Co...	300, **600**	P G ..	—	—	—	
Sturgeon Bay[1].. ..	KJOI	—	U.S. Shipping Board	300, **600**	P G ..	X	0.20	—	
Sucrosa[3]	KNS	—	Cuba Distilling Co.	300, **600**	P G ..	—	—	—	
Sudbury[3]	KRZ	—	Shawmut S.S. Co.	300, **600**	P G ..	—	—	—	

Suffolk [3]	WRS	—	Coastwise Transit Co.	300, 600	P G	—	—	—
Sun [3]	KTU	—	Sun Company	300, 600	P G	—	—	—
Sunbeam [1]	KODC	—	Sun Company	300, 600	P G	X	0.20	—
Sundance [1]	KORD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sunlite [3]	KPQ	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	X	0.20	—
Sunoil [3]	KWP	—	Sun Company	300, 450, 600	P G	—	—	—
Sunshine [1]	KOFG	—	Sun Company	300, 600	P G	X	0.20	—
Suriname [3]	KLI	—	United Fruit Co.	300, 600	P G	—	—	—
Suruga [3]	KGD	—	New York & Oriental S.S. Co.	300, 450, 600	P G	X	0.20	—
Susana [3]	KNX	—	F.I.A.T. Corporation	300, 600	P G	—	—	—
Susanna II [3]	KEMG	—	Madrigal & Co.	300, 600	P G	—	—	—
Susquehanna [1]	KOLN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Susquehanna [3]	WEM	—	Susquehanna S.S. Co.	300, 450, 600	P G	—	—	—
Sutherland [1]	WTJ	—	U.S. Shipping Board	300, 476, 600	P G	X	0.20	—
Suwanee [3]	WLY	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
S. V. Harkness [3]	KEU	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	—	—	—
Swampscott [1]	WQIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Sylvan Arrow [3]	KSX	—	Standard Transportation Co.	300, 600	P G	—	—	—
Tacony [1]	WLB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tamesi [3]	WTE	—	Sinclair Gulf Corp.	300, 450, 600	P G	—	—	—
Tanamo [3]	KVN	—	Atlantic Fruit Co.	300, 450, 600	P G	—	—	—
Tanka [1]	KEFF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tankerville [1]	KOKB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tartar [1]	KEKS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tatoosh [3]	WPE	—	Western Fuel Co.	300, 600	P G	—	—	—
Tavernilla [3]	KEMT	—	—	—	—	—	—	—
Teal [3]	KOTC	—	Teal Co.	300, 600	P G	X	—	—
Teresa [1]	WJF	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Terre Haute [1]	KOPJ	—	U.S. Shipping Board	300, 600	P G	N	0.20	—
Texan [3]	WKT	—	American Hawaiian S.S. Co.	300, 600	P G	—	—	—
Texarkana [1]	KOCD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Texas KUM [3]	KUM	—	The Texas Co.	300, 450, 600	P G	—	—	—
Thala [3]	KIQQ	—	Nacirema S.S. Corp.	300, 600	P G	X	0.20	—
The Harvester [3]	WCR	—	Internat. Harv. Co.	300, 600	P G	X	0.20	—
The Lambs [1]	KEBZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
The Limit [3]	WCV	—	Whitney Bros & Co.	300, 600	P G	X	0.20	—
Tidewater [3]	KOU	—	Nafra Co.	300, 450, 600	P G	—	—	—
Tiger [2]	KIT	—	Standard Transportation Co.	300, 450, 600	P G	—	—	—
Tillamook [1]	WMOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tionesta [3]	WCA	—	E. & W. Tr. Co.	300, 600	P G	X	0.20	—
Tipton [1]	WQOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Tivives [3]	KMI	—	United Fruit Co.	300, 600	P G	—	—	—
Toiler [1]	WTOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Toka [1]	KPAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Toledo [3]	KTV	—	Sun Company	300, 600	P G	X	0.20	—
Tollard [3]	KEVX	—	U.S. Transport Co.	300, 600	P G	X	0.20	—
Tolo [1]	WQOI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Topila [1]	KKE	—	Southern Pacific Co.	300, 450, 600	P G	X	0.20	—
Tormentor [3]	KFN	—	Freeport & Tampico Fuel Oil & Transportation Corporation	300, 600	P G	X	0.20	—
Torres [3]	KKF	—	Southern Pacific Co.	300, 450, 600	P G	—	—	—
Toula [1]	KGUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Transportation [3]	KEJX	—	Coastwise Transportation Co.	300, 600	P G	X	0.20	—
Traveller [1]	KIVK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Tri Mountain [1]	KOQF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Trinidadian [2]	KNO	—	Gulf Refining Co.	300, **600**	P G	X	0.20	—	
Tripp [1]	KIMC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Triumph [1]	KEND	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Trontolite [2]	KOM	—	Standard Oil Co. of New Jersey	300, **600**	P G	—	—	—	
Tuckahoe [1]	KJOU	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Tuckanuck [1]	KIMB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Tulsa [1]	KIXR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Tunica [1]	WJP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Turrialba [2]	KDT	—	United Fruit Co.	300, **600**	P G	—	—	—	
Tuwetanka [1]	KOLG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Twilite [2]	KPO	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	X	0.20	—	
Tyee WSIO [1]	WSIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Tyee KENB [1]	KENB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Ulysses [2]	KPU	—	Panama Railroad Co.	300, **600**	P G	—	—	—	
Umatilla [2]	KSUO	—	Pacific S.S. Co.	300, **600**	P G	—	—	—	
Undaunted [2]	WGM	—	Hind, Rolph & Co.	300, **600**	P G	X	0.20	—	
United States [3]	KZU	—	E. H. R. Green	300, 450, **600**	P G	—	—	—	
Utina [1]	KIPM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Utoka [1]	KERK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Vacuum II [1]	KIMK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Valdez [4]	WAK	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Vanada [5]	KOBF	—	U.S. Transport Co.	300, **600**	P G	X	0.20	—	
Velero [2]	WHV	—	G. Allan Hancock	300, **600**	P G	—	—	—	
Venetia [2]	WOV	—	J. D. Spreckels	300, **600**	P	—	—	—	
Venezuela [6]	WBG	—	Pacific Mail S.S. Co.	300, **600**	P G	—	—	—	
Ventura [3]	WHL	—	Oceanic S.S. Co.	300, **600**	P G	—	—	—	
Vesta KTS [2]	KTS	—	Standard Oil Co. of New York	300, 450, **600**	P G	X	0.20	—	
Victoria [4]	WAD	—	Alaska S.S. Co.	300, **600**	P G	—	—	—	
Victorious [1]	WXIA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Vigo [3]	KMC	—	A. A. Miller	300, 450, **600**	P G	—	—	—	
Vincent [1]	KIZS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Vinita [1]	KOTL	—	U.S. Shipping Board	300, **600**	P G	N	0.20	—	
Vinton County [1]	KORQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Virginia [5]	KUV	—	The Texas Co.	300, 450, **600**	P G	—	—	—	
Virginian [6]	WKV	—	American Hawaiian S.S. Co.	300, **600**	P G	—	—	—	
Vittorio Emmanuele III [1]	KBUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Vizcaya [3]	WSQ	—	—	300, 600	P G	—	—	—
Volunteer [3]	WFAO	—	Pacific Mail S.S. Co.	300, 600	P G	—	—	—
Waban [1]	KJT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wabash [1]	WNC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wacha [1]	WPEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wachusett [1]	WJL	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waco [1]	KIRP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wacouta [1]	WLG	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
Wahkeena [3]	WMS	—	Wahkeena S.S. Co.	300, 600	P G	X	0.20	—
Wahkiakum	KNIA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wakanna [1]	KKOU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wakan [1]	WDAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wakiki [1]	WRUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wakulla [1]	KRUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Walden [1]	KIGG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wallingford [1]	KEPV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wallkill [1]	KIPD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wallowa [1]	KQAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wallula [3]	WPY	—	Port of Portland	300, 450, 600	P G	—	—	—
Walter A. Luckenbach [4]	KJIE	—	Luckenbach S.S. Co.	300, 600	P G	—	—	—
Walter D. Munson [3]	KVJ	—	Munson S.S. Co.	300, 450, 600	P G	—	—	—
Walter D. Noyes [3]	KDY	—	Crowell & Thurlow	300, 600	P G	—	—	—
Walter Hardcastle [3]	KQB	—	Sinclair Gulf Corp.	300, 600	P G	—	—	—
Wampum [1]	KROI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wana [3]	KYX	—	Geo. C. Sherman	300, 600	P	—	—	—
Waneyanda [1]	WXIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wanzu [1]	WDAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wapama [3]	WMG	—	Wapama S.S. Co.	300, 600	P G	X	0.20	—
Wasagya [3]	KOPN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wasco [1]	KKIO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Washtenaw [6]	WPOO	—	Union S.S. Co.	300, 600	P G	—	—	—
Wassaic [1]	KROO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Watauga [1]	WQT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waterbury [1]	KOKC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Watertown [1]	KING	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wathena [1]	WDIE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Watonwan [1]	WDII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waubesa [1]	WGOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wauconda [1]	WREE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waukau [1]	KIDV	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waukegan [1]	KIDX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waukesha [1]	KKEO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wawalona [5]	KEXM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Waxahachie [1]	KILM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wayhut [1]	WGUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wayucan [1]	KKUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
W. B. Keene [3]	KWK	—	S.N.Y. Transit Co.	300, 600	P G	X	0.20	—
W. C. Teagle [3]	KTY	—	Standard Oil Co. of New Jersey	300, 450, 600	P G	X	—	—
Wekika [1]	KIXX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Wellington [3]	KMR	—	H. W. Cook	300, 450, 600	P G	X	0.20	—
Wenakee [1]	WXII	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Alcoz [1]	KIDD	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Aleta [1]	KIQG	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Alsek [1]	KJUO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
							Francs.	Francs.	
UNITED STATES OF AMERICA—*contd.*									
West Amargosa [1]	KEJS	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Apaum [1]	KJUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Arrow [1]	WKS	—	U.S. Shipping Board	300, 476, **600**	P G	X	0.2	—	
West Arvada [1]	KVIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Ashawa [1]	KFH	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Avenal [1]	KENG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westboro [1]	KBUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westbridge [1]	KJOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westbrook [1]	WLI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cactus [1]	KIVV	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Caddew [1]	KODF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cajoot [1]	KEXX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Calumb [1]	KILT	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cape [1]	WXEO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Carnifax [1]	KEFC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Carruth [1]	KESJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Catanace [5]	KEE	—	El Dorado S.S. Co.	300, **600**	P G	X	0.20	—	
West Cavanal [1]	KIFD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cawthon [1]	KILZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cayote [1]	KIRF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Celeron [1]	KKJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Celina [1]	KEZR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Chatala [1]	KIPJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westchester [1]	WCL	—	U.S. Shipping Board	300, 476, **600**	P G	X	0.20	—	
West Cheswald [1]	KIXB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Chetac [1]	KIMG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cherow [1]	KJM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Coast [1]	KRAA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cobalt [1]	KEKD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cohas [1]	KNAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Compo [1]	KENJ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Conol [1]	KIFP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Corum [1]	KEVD	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Cressy [1]	WGOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Durfee [1]	KJAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Eagle [1]	WQZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Ekonk [1]	KQIU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

West Elcajon[1]	KELK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Elcasco[1]	WJOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Eldara[1]	WJOE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Ally[1]	KEJF	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Belle[1]	WKUI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Chief[1]	KNAO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western City[1]	KNAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Comet[1]	WXEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Cross[1]	KTEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Westerner[1]	KIK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Front[1]	WJQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Glen[1]	KEDR	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Hero[1]	KIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Hope[1]	WFIA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western King[1]	WEP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Knight[1]	KEFQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Maid[1]	KQOO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Ocean[1]	KJEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Plains[1]	WZIU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Pride[1]	WGT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Queen[1]	WWK	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Scout[1]	WXEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Sea[1]	KNAA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Spirit[1]	KNEA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western Star[1]	WEU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Western States[2]	WED	—	D. & C. Nav. Co.	300, 600	P G	—	—	—
Western Wave[1]	WWC	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Erral[1]	KERJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Westfield[1]	KXU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Westford[1]	KNAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Galata[1]	KOJJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Galeta[1]	WFAE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Galoc[1]	KVEI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Gambo[1]	KQUU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Gotomska[1]	WET	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Grama[1]	WGIA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Westgrove[1]	KJAU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Westhampton[1]	WSP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Harcuvar[1]	KEZM	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hardaway[1]	KEDX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hargrave[1]	KEDZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Harlan[1]	KEFS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hartland[1]	KEGS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hartley[1]	KEGT	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Harshaw[1]	KEFX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Harts[1]	KEFZ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hassavampa[1]	KEGX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Haven[1]	KJV	—	U.S. Shipping Board	300, 450, 600	P G	X	0.20	—
West Helix[1]	WSUA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hematite[1]	KEZP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hembric[1]	KEZN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Henshaw[1]	KEBQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hepburn[1]	KINP	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
West Hesseltine[1]	KOTN	—	U.S. Shipping Board	300, 600	P G	X	0.20	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
West Hobomac[1]	WFAI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Hosokie[1]	WFEI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Humhaw[1]	WZAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Imboden[1]	KECX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Indian[1]	KJAE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Inskip[1]	KITZ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Ira[1]	KOGL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Irmo[1]	KIFB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Islay[1]	KICP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Isleta[1]	KICQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Islip[1]	KIKX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Ison[1]	KINN	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Ivis[1]	KOQQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Jaffrey[1]	KOCX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Jena[1]	KOTG	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Kader[1]	KOSL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Kasson[1]	KIKM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Katan[1]	KOBK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Keene[1]	KISK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Kyska[1]	WJOU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Lake[1]	WTH	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westland[1]	KJX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Lashaway[1]	WREA	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Lianga[1]	KJAO	—	U.S. Shipping Board	300, 376, **600**	P G	X	0.20	—	
West Loquassuck[1]	WJOI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Madaket[1]	WJOO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Mahomet[1]	WTUU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Maximus[1]	KEDQ	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westmead[1]	WDIO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Mingo[1]	KORB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Modus[1]	KENK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Montop[1]	KOTR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westmoreland[1]	KIQC	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Westmount[1]	KBUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Munham[1]	KEXF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Neris[1]	KOTK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
West Nohno[1]	KEXG	—	U.S. Shipping Board	300, **600**	P G	X	0.20		

West Nosska[1]	KEDV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Westoil[1]	KIVP	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Pocasset[4] ..	KOCK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Point[1]	KJY	—	U.S. Shipping Board	300, 450, 600	P G ..	X	0.20	—
Westpool[1]	WROA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Port[1]	WFEO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Quechee[1] ..	KEDT	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Raritans[1] ..	KIXC	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Saginaw[2] ..	KOCV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Segovia[1] ..	KIPK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Selene[5]	KIXZ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Sequana[1] ..	WSOI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Shore[1]	WMD	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Tacook[1] ..	KECR	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Togus[1]	KEXJ	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Totant[1]	KEXK	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Vaca[1]	KEMX	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West View[1]	WDIU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Westward Ho[1] ..	WKX	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Wauna[1]	WSUB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Wauneke[1] ..	WSUI	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Westwego[2]	KGE	—	Union Pet. S.S. Co.	300, 450, 600	P G ..	—	—	—
West Wind[1]	KJH	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Westwood[1]	WTF	—	U.S. Shipping Board	300, 478, 600	P G ..	X	0.20	—
West Zeda[1]	WKUU	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Zucker[1]	WJIA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
West Zula[1]	WQEO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
W. F. Burrows[4] ..	WHG	—	Libby, McNeill & Libby Co. ..	300, 600	P G ..	—	—	—
W. F. White[2]	WGC	—	Limestone Transportation Co. ..	300, 450, 600	P G ..	X	0.20	—
Wheatland Montana[1]	KISF	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Wheaton[1]	WMUA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Whitemarsh[2]	KOMG	—	F. R. Payne	—	—	—	—	—
Whittier[2]	WHT	—	T. A. Hays	300, 600	P G ..	—	—	—
W. H. Tilford[2] ..	KPD	—	Standard Oil Co. of New Jersey ..	300, 600	P G ..	—	—	—
Wicasta[1]	KIJG	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Wico[2]	KNN	—	Standard Oil Co. of New Jersey	300, 600	P G ..	—	—	—
Widgeon[1]	KOSB	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Wihaha[1]	WDEA	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Wild Duck[2]	KYG	—	Gulf Refining Co.	300, 600	P G ..	X	0.20	—
Wild Goose[2]	KOTS	—	Wild Goose Co. (Inc.)	300, 600	P G ..	X	—	—
Wildwood[1]	KORV	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
Wilhelmina[2]	WMO	—	Matson Nav. Co.	300, 450, 600	P G ..	—	—	—
Wilhelm Jebsen[1] ..	WNQ	—	U.S. Shipping Board	300, 450, 600	P G ..	X	0.20	—
Willamette[2]	WSW	—	Willamette S.S. Co.	300, 600	P G ..	X	0.20	—
William A. McKenney[3]	WOM	—	Crowell & Thurlow	300, 600	P G ..	—	—	—
Willimantic[2]	KMIO	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
William A. Reiss[2] ..	WNI	—	Reiss S.S. Co.	300, 600	P G ..	X	0.20	—
William G. Mather[2] ..	KKUI	—	Cleveland Cliffs Iron Co. ..	300, 450, 600	P G ..	X	0.20	—
William Green[2] ..	WIY	—	Pan-Amer. Petro. & Transp. Co. ..	300, 450, 600	P G ..	X	0.20	—
William Isom[2]	KVY	—	Amer.-Italian Comm. Corp. ..	300, 450, 600	P G ..	X	0.20	—
William M. Mills[1] ..	KEJT	—	U.S. Shipping Board	300, 600	P G ..	X	0.20	—
William N. Page[2] ..	WFOO	—	Castner Curran & Bullitt ..	300, 600	P G ..	X	0.20	—
William O'Brien[2] ..	KPN	—	Huron Nav. Co.	300, 600	P G ..	—	—	—
Windber[2]	WND	—	Pacific-American Fisheries ..	300, 450, 600	P G ..	—	—	—

Ship Stations—*Continued*

Name.	Call Signal.	Normal Range in Nautical Miles.	Shipping Line or Ship Owner.	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service Performed.	Hours of Service.	Ship Charge. Per Word.	Ship Charge. Minimum per Radio-telegram.	Notes.
UNITED STATES OF AMERICA—*contd.*							Francs.	Francs.	
Winding Gulf [3]	WFEE	—	Castner, Curran & Bullitt	300, **600**	P G	—	—	—	
Winifred [5]	KTE	—	Gulf Refining Co.	300, **600**	P G	—	—	—	
Winnebago [2]	KTEI	—	American Transatlantic Co.	300, 450, **600**	P G	—	—	—	
Winona County [1]	KIZR	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Winyah [1]	KIMM	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Wisconsin Bridge [2]	KIBM	—	French-American Line	300, **600**	P G	X	0.20	—	
Wishkah [1]	KNEU	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Wisla [1]	KOTP	—	L. H. Mills	—	—	—	—	—	
Wisteria [1]	KOJN	—	Foreign & Domestic Transport Cor.	300, **600**	P G	X	0.20	—	
W. L. Steed [1]	WSEE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
W. M. Burton [1]	KMIU	—	Atlantic Refining Co.	300, **600**	P G	X	0.20	—	
Wm. F. Herrin [6]	WTN	—	Associated Oil Co.	300, **600**	P G	—	—	—	
Wm. G. Warden [2]	KNF	—	Standard Oil Co. of New Jersey	300, 450, **600**	P G	—	—	—	
W. M. Irish [1]	KJOE		Atlantic Refining Co.	300, **600**	P G	X	0.20	—	
W. M. Tupper [3]	WJR	—	Gulf & Southern S.S. Co.	300, **600**	P G	—	—	—	
Woodman [1]	KIBP	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Woodmansie [1]	KIPF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Woonsocket [1]	WCW	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Worcester [1]	KIKL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Wowahbe [1]	KIBX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Woyaca [1]	KETK	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
W. S. Porter [6]	WTM	—	Associated Oil Co.	300, **600**	P G	—	—	—	
W. S. Rheem [1]	WGAO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Wyandotte WCO [2]	WCO	—	Wyandotte Transportation Co.	300, **600**	P G	X	0.20	—	
Wyandotte WJW [1]	WJW	—	U.S. Shipping Board	300, 450, **600**	P G	X	0.20	—	
Wynooche [1]	KFE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Wyoming [3]	KQT	—	France-Canada S.S. Corporation	300, 450, **600**	P G	X	0.20	—	
Wytheville [1]	KITL	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Xenia [2]	KOLQ	—	Foreign & Domestic Transport Cor.	300, **600**	P G	X	0.20	—	
Yadkin [1]	KWL	—	U.S. Shipping Board	300, **600**	P G	X	2.20	—	
Yainax [1]	WXAB	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yakima [1]	KNUI	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yaklok WSUO [1]	WSUO	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yaklok KIGX [1]	KIGX	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yamhill [1]	WVIE	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yaquina [1]	KENF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	
Yawah [1]	KEDF	—	U.S. Shipping Board	300, **600**	P G	X	0.20	—	

Yehama [1]	KVAU	—	Archibald L. Stark	300, 600	P G	X	0.20	—
Yellowstone [1]	KJEE	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yesoking [1]	KERQ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yomachichi [4]	WPAI	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
York Harbor [1]	KOJB	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yosemite WQY [3]	WQY	—	Pope & Talbot	300, 600	P G	X	0.20	—
Yosemite KYS [1]	KYS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Youngstown [1]	KIFX	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yucca [1]	KWJ	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yuken [1]	WXEU	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Yuma [3]	WJAI	—	New York & Porto Rico S.S. Co.	300, 600	P G	—	—	—
Zaca [1]	WKOA	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Zacapa [3]	KLB	—	United Fruit Co.	300, 600	P G	—	—	—
Zapora [4]	WPQ	—	Booth Fisheries Co.	300, 600	P G	—	—	—
Zarembo [1]	KICS	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Zavalla [1]	KEVC	—	Nacirema S.S. Corp.	300, 600	P G	X	0.20	—
Zenith [3]	KZE	—	Charles Longstreeth	300, 600	—	—	—	—
Zirkel [1]	WREO	—	U.S. Shipping Board	300, 600	P G	X	0.20	—
Zulia [3]	KDZ	—	Atlantic & Caribbean S.N. Co.	300, 450, 600	P G	X	0.20	—

URUGUAY

Baron de Rio Branco	CWG	55	Navy	450, 600	O	—	—	—
Diez y ocho de Julio	CWF	55	Navy	450, 600	O	—	—	—
Ingeniero	CWH	55	Navy	600	O	—	—	—
Montevideo CWE	CWE	220	Navy	450, 600	O	—	—	—
Oyarvide	CWI	55	Hydrographic Service	450, 600	O	—	—	—
Uruguay CWD	CWD	220	Navy	450, 600	O	—	—	—

CALL LETTERS

THE BUREAU INTERNATIONAL DE L'UNION TELEGRAPHIQUE OF BERNE allots to the various nations who are parties to the International Radiotelegraphic Convention combinations of "call" letters, which are in turn allotted to ship and land stations. Below we give a list of the letters, and combinations of letters, and the countries to which these have been assigned.

Call Letters	Country
AAA to AZZ	Germany.
BAA to BZZ	Great Britain.
CAA to CEZ	Chile.
CFA to CFZ	Canada.
CGA to CGZ	Australia.
CHA to CHZ	Canada.
CIA to CIZ	Newfoundland.
CJA to CKZ	Canada.
CLA to CMZ	Spain.
CNA to CNZ	Morocco.
COA to COZ	Great Britain.
CPA to CPZ	Bolivia.
CQA to CQZ	Monaco.
CRA to CRZ	Portuguese Colonies.
CSA to CUZ	Portugal and Colonies and Possessions.
CVA to CVZ	Roumania.
CWA to CWZ	Uruguay.
CXA to CXZ	Spain.
CYA to CZZ	Mexico.
DAA to DZZ	Germany.
EAA to EHZ	Spain and Colonies.
EIA to EZZ	Great Britain.
FAA to FZZ	France and Colonies.
GAA to GZZ*	Great Britain.
HAA to HAZ	Austria, Hungary, Bosnia, Herzegovina.
HBA to HBZ	Switzerland.
HGA to HHZ	Siam.
HIA to HIZ	Dominican Republic.
HJA to HKZ	Colombia.
HLA to HNU	Spain.
HNV to HNZ	New Hebrides.
HOA to HZZ	France and Colonies and Protectorates.
IAA to IZZ	Italy.
JAA to JZZ	Japan.
KAA to KCZ	Germany.
KDA to KZZ*	U.S. of America and Possessions.
LAA to LHZ	Norway.
LIA to LNZ	Argentine Republic.
LOA to LOZ	Norway.
LPA to LRZ	Argentine Republic.
LSA to LUZ	Great Britain.
LVA to LVZ	Guatemala.
LWA to LWZ	Norway.
LXA to LZZ	Bulgaria.
MAA to MZZ	Great Britain.
NAA to NZZ*	U.S. America and Possessions.
OAA to OBZ	Peru.
OCA to OFZ	Great Britain.
OGA to OMZ	Austria, Hungary, Bosnia, Herzegovina.
ONA to OTZ	Belgium and Colonies.
PAA to PIZ	Holland.
PJA to PJM	Dutch West Indies.
PJN to PJZ	Surinam (Dutch Guiana)
PKA to PMZ	Dutch East Indies.
PNA to PPZ	Brazil.
PQA to PSZ	Portugal.
PTA to PVZ	Brazil.
PWA to PWZ	Cuba.
PXA to PZZ	Holland.
RAA to RZZ	Russia.
SAA to SMZ	Sweden.
SNA to STZ	Brazil.
SUA to SUZ	Egypt.
SVA to SZZ	Greece.
TAA to TEZ	Turkey.
TFA to TFZ	Iceland.
TGA to THZ	Greece.
TIA to TMZ	Spain.
TQA to TTZ	Norway.
TVA to TZZ	Holland.
UAA to UMZ	France and Colonies and Protectorates.
UNA to UZZ	Austria, Hungary, Bosnia, Herzegovina.
VAA to VGZ	Canada.
VHA to VKZ	Australia.
VLA to VMZ	New Zealand.
VNA to VNZ	South Africa.
VOA to VOZ	Newfoundland.
VPA to VSZ	British Colonies not autonomous.
VTA to VWZ	India.
VXA to VXZ	Other British Possessions.
VYA to VYZ	Newfoundland.
VZA to VZZ	Australia.
WAA to WZZ*	U.S. America and Possessions.
XAA to XDZ	Mexico.
XEA to XMZ	Great Britain.
XNA to XSZ	China.
XTA to XZZ	Great Britain.
YAA to YZZ	Great Britain.
ZAA to ZZZ	Great Britain.

* Owing to these series of call letters having become exhausted, it has been necessary to introduce a four-letter series beginning with the same initial letter.

CALL LETTERS

(*Alphabetically arranged*)

ALLOTTED TO LAND AND SHIP STATIONS.

b = Ship Station. *c* = Land Station.

		PAGE
B	*c*. Baracoa	467
BAA	*b*. Hitchin	587
BAB	*b*. Trevalgan	626
BAD	*b*. Baymanter ..	557
BAF	*b*. Baylula	557
BAH	*b*. Claymont	571
BAI	*b*. Glastonbury ..	582
BAJ	*b*. Abercorn	550
BAK	*b*. Appleby	553
BAM	*b*. Prairial	613
BAN	*b*. Sunray	622
BAR	*b*. Vittellia	629
BAS	*b*. Oreland	607
BAU	*b*. Baron Inchcape ..	556
BAW	*b*. Rio Preto ..	615
BBH	*b*. Butetown ..	561
BBI	*b*. Central No. 1 ..	564
BBJ	*b*. City of Belfast ..	565
BBM	*b*. Mount Berwyn ..	603
BBO	*b*. Thamesmede ..	625
BBQ	*b*. Tynemede	627
BBS	*b*. Colonia BBS ..	571
BBV	*b*. Corcrest	572
BBW	*b*. War Soldier ..	634
BBX	*b*. Milton BBX ..	602
BBY	*b*. War Knight ..	633
BCB	*b*. Greleden	585
BCC	*b*. Blackhill	559
BCD	*b*. City	565
BCE	*b*. Zelo	634
BCG	*b*. Crown of Navarre ..	573
BCH	*b*. Crown of Granada ..	573
BCI	*b*. John Sanderson ..	591
BCL	*b*. War Prince	633
BCP	*b*. Canadier	562
BCQ	*b*. Cardigan	563
BCR	*b*. Anglesea	552
BCS	*b*. Capelcastle ..	562
BCT	*b*. Southlea	621
BCU	*b*. Clan Keith ..	567
BCV	*b*. Northern	605
BCZ	*b*. Apsleyhall ..	553
BDB	*b*. Karoa	592
BDC	*b*. Glenaffric	582
BDD	*b*. Corby	572
BDE	*b*. Coquetmede ..	572
BDF	*b*. Clydesdale BDF ..	571
BDH	*b*. Dictator	575
BDI	*b*. Patrician	609
BDJ	*b*. Westborough ..	631
BDK	*b*. Newquay	605
BDM	*b*. Burgundy	561
BDO	*b*. Benmohr	558
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BDQ	*b*. Priestfield	613
BDR	*b*. Swinburne ..	622
BDS	*b*. City of Birmingham	565
BDT	*b*. Pembroke	609
BDV	*b*. Visigoth	629
BDY	*b*. Buckleigh	561
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METEOROLOGICAL SECTION

(A) Radio-communication and Meteorology.

(B) Wireless and Time.

(C) Arrangements Current in various Countries.

RADIO-COMMUNICATION AND METEOROLOGY

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I.—General.

METEOROLOGY may be divided broadly into two great branches—(*a*) "climatology," or the analysis and classification of the records of past weather, and (*b*) "weather forecasting," or the deduction of future weather from the present and past conditions. Each of these main branches has numerous ramifications, and neither can be regarded as independent of the other; indeed, climatology depends for its usefulness mainly on the fact that future conditions will on the average be nearly identical with past conditions, and climatology is in this respect generalised forecasting. When the children of Israel left Egypt for Palestine they put their trust in a climatogical "forecast." When the British Army, on the evening of November 19th, 1917, issued orders for the attack on Cambrai to begin the following morning, it put its trust in a "weather forecast"—a weather forecast so excellent that the General commanding the Tank Corps which led the attack characterised it as a forecast as accurate as a description could have been of the wind, weather and visibility.

Both types of information are essential to success in peace as in war. The transport company which issues instructions for precautionary measures against frost at the beginning of each winter relies on a climatological forecast; a wise company will utilise the information given in weather forecasts of the probable termination of a mild spell in winter to draw the attention of all concerned to the precautionary measures. The man who contemplates the erection of sheds for drying timber wants a climatological forecast of the winds, the rainfall and the humidity, so that he may choose the most suitable place available, and so that he may give his sheds the correct orientation, and know beforehand how much natural drying he can, in the long run, depend upon. The road surveyor who contemplates tarring a stretch of road wants a "weather" forecast so that he may not find his tarring operations wasted by a heavy fall of rain immediately afterwards.

These examples have been chosen because they refer to aspects of meteorological usefulness which are not so obvious as the applications to agriculture, fishing and aviation.

It has been said that the function of science is to replace experience, to enable one man to profit by the experience of another, and to save him the troubles and disappointments which are the inevitable companions of the man who insists on accumulating unnecessary experience for himself. In no branch of science is this *economy* more marked than in meteorology. The experience of an observer on a lonely island in the Hebrides, interpreted by the scientific expert in meteorology, may save the Yarmouth fishing fleet the loss of its nets, perhaps even the lives of its sailors. A few readings of the barometer plotted on a chart

furnish to the expert the means of supplying to the artillery the wind in the upper air to be allowed for in shooting, when no direct means of observing that wind are available.

Wireless telegraphy is directly applicable only in the preparation and distribution of "weather" forecasts; but since climatological forecasts must give the average conditions and frequency of occurrence of precisely those weather characteristics which are necessary for an accurate description of existing weather and for a "weather" forecast, climatology will in the end depend very largely upon the observations which wireless telegraphy transmits, as these are the observations which will be most generally recorded and most carefully scrutinised.

II.—Meteorology and War.

(a) *Troy to Waterloo.*

The importance of the weather in military operations is shown in history from the earliest times. Sir Napier Shaw, in the "Weather Map," quotes an episode in a Syrian campaign illustrating its control of Q.

> "Now they that were in the town sent messengers unto Tryphon to the end that he should hasten his coming unto them by the wilderness, and send them victuals.
>
> "Wherefore Tryphon made ready all his horsemen to come that night; but there fell a very great snow, by reason whereof he came not."

Even earlier than this, the Greek fleet was kept by contrary winds for weeks on the western side of the Ægean Sea until the leaders were at their wits' end for expedients to keep the growing dissatisfaction in the ranks from breaking up the expedition against Troy. Achilles' caustic comment on the weather prophet of that time is still appropriate to those quacks who pretend to an intuitive perception of future weather: "The prophet! What is he? A man who speaks 'mongst many falsehoods but few truths, whene'er chance leads him to speak true."

Hannibal's grand campaign failed largely owing to the imperfectly realised climate of the Alps in October.

A spell of north-east winds in September, 1066, kept William the Conqueror's fleet on the shores of Normandy and brought Harold Hardrada to the Yorkshire coast; the English Harold was drawn from his defence against the Norman, lost officers and men whom he could ill spare in the hard-won victory of Stamford Bridge, and returned to find that the break up of the spell had permitted William to cross the Channel and effect a landing unopposed. The north-east winds of that September were as momentous as any in history.

In July, 1588, the same south-westerly breeze before which the Spaniards sailed up the English Channel indicated "a depression on the Atlantic," the precursor of the stormy series which consummated the destruction of the Armada.

The thick morning mist at Blenheim on August 13th, 1704, enabled Marlborough to surprise the French and gain the initial advantage in that critical battle.

The heavy rain during June 17th, 1815, and the following night was responsible for Napoleon's delay in beginning the battle of Waterloo

on the 18th; besides rendering the ground more difficult for his attacks, this rain therefore made a further contribution to his utter defeat by the postponement which gave time for Blucher and his army to reach the field and take part in the final stages of the battle.

(b) *The Crimean War and the Birth of Synoptic Meteorology.*

In all these cases the weather had been regarded as an unforeseeable, unavoidable blessing or calamity; but a new era dawned in the middle of the nineteenth century with the invention of the electric telegraph and the progress of scientific enterprise; the final stimulus came from war, or rather from an incident in a campaign where even a fair "climatological" forecast would have saved the British Army untold loss and suffering. On November 14th, 1854, during the Crimean war, a storm burst suddenly upon the British and French fleets in the Black Sea, and did much damage, wrecking one French battleship. The French astronomer, Leverrier, joint-discoverer with John Couch Adams of the planet Neptune, collected evidence which showed that the storm had travelled across Europe and might have been foreseen, had telegraphic reports been available at a central office. Actually, indeed, a project of this kind had been advocated in England in 1848 at the annual meeting of the British Association for the Advancement of Science, but sufficient support was not forthcoming to give effect to the proposal, although *The Daily News* had published in June, 1849, a collection of reports from about thirty places. Leverrier's report made the French Government move; and the meteorological department of the British Board of Trade, established in 1854 under Captain (afterwards Admiral) Fitzroy, also took steps to organise a telegraphic system of reports, being stimulated further in its efforts by the "Royal Charter" storm of October 26th, 1859. After organising a system for collecting reports, Fitzroy also inaugurated a scheme of storm warnings and weather forecasts, before he had satisfied the scientific society of his day that these forecasts and warnings were established on a sound basis of principle; criticism and opposition arose, and Fitzroy died in April, 1865, and at the end of the following year the forecasts were discontinued for thirteen years until 1879; although the warnings of storms were recommenced in 1867, after a brief interval, their renewal being apparently due to pressure through Parliament.

(c) *The European War.*

At the outbreak of the European war in 1914 there was a tolerably complete network of meteorological stations in Europe contributing observations daily at 0700 Greenwich time and, for a few stations, again at 1800; additional reports were also made at 1300 or 1400, mainly for use during the summer months in the preparation of harvest forecasts, although in France the reports at 1400 were more general and more fundamental in the organisation of their service than the reports at 1800.

None of the military services, however, understood the importance and the power of the scientific development of meteorology which had taken place in the preceding 35 years; the forecasts in the daily Press constituted the meteorological pabulum of 90 per cent. of the nation, and these were over twelve hours old before they were read; of the

functions of meteorology outside these forecasts hardly any conception existed. The principal aim of those in power was to prevent the enemy securing meteorological reports, whereas this should have been a matter of secondary importance compared with the necessity for a right use by ourselves. Lieut. J. Rouch, of the French Navy, who was head of the French military meteorological service in 1916–17, relates that in April, 1915, a French Admiral, attached to the Army, busied himself with the preparation of a weather chart. To someone who evidently thought he might have been better employed the Admiral remarked: "I know that we are forbidden to publish meteorological observations to the enemy, but I did not know that we pushed the spirit of chivalry so far as to interdict their use by ourselves."

When the first Zeppelin raid was effected and bombs dropped in the Eastern Counties, my suggestion that the objective had been London and the design frustrated by an unanticipated upper wind was immediately verified by the meteorological reports. This information stimulated the military authorities, and as it was shortly followed by the first German gas attack a move was made towards the establishment of a military meteorological service in the field. This began in June, 1915, in France. Col. H. G. Lyons, F.R.S., inaugurated the service at St. Omer on June 10th, and then returned to London to arrange for a service at Gallipoli. The development of the service was gradual, but the wonderful elasticity of the British Army allowed much to be done for which no authorised establishment existed. With the prospect of a direct use of wind in retaliatory gas attacks the Army Command felt it necessary to test beforehand the accuracy of the forecasts; they stood the test so well that the decision to attack at Loos on September 25th was taken the preceding evening, at a time when the wind was blowing strongly from south-east, on the strength of the meteorologists' forecast of a change to south-west in the interval between the decision and the time of attack; the change occurred as predicted, though three hours after the discharge of gas the wind changed back to the east side of south. This was the first of a long series of gas attacks, of which the most brilliant, from a meteorological point of view, occurred in March, 1918. On that occasion, gas was projected on the advice of the meteorologist in a light westerly wind, although the wind ten miles west of the place of discharge was *easterly*.

Wireless was not used in the war on land for the distribution of meteorological information so much as it might have been. This was partly due to the slow development of the "continuous wave" system which was essential to success.

In 1916 the distribution of reports to the Artillery appeared eminently a task for wireless. These reports contained the particulars of wind and temperature required by the gunners to admit of accurate shooting from the map: they were issued from Army Headquarters and transmitted to each battery: to ensure the best results it was essential that the reports should reach the batteries within one hour of the time of issue. Under normal conditions this was achieved by ordinary telegraphy, but during a battle delays were frequent. The significance of this was, however, inadequately realised in 1916 and the Artillery experts thought it inexpedient to alter the then existing method of distribution, although the Royal Flying Corps was willing to use its wireless service in co-operation. A year later the Artillery

were ready to adopt wireless, but by that time the methods of aerial warfare had changed so much that the Royal Flying Corps was unable to lend the necessary co-operation of its wireless personnel and instruments; and the resources of instruments and trained personnel outside the Flying Corps were quite inadequate to permit of the reception at the batteries of broadcasted meteorological messages issued every four hours. Besides these reports to the Artillery, "Meteor Reports," as they were called for brevity, additional similar reports were required as the effect of wind and temperature on sound-ranging could only be allowed for by a rapid distribution of special meteorological reports every hour during sound-ranging weather. These were distributed by wireless in 1918.

As night-flying developed the need for short-period forecasts, covering about six hours, and rapidly distributed, was emphasised; and in 1918 these were distributed in code twice each evening by wireless from Montreuil; and in 1918, too, reports of upper winds up to 20,000 feet were also issued by wireless for the use of the Royal Air Force; each of these reports indicated the information on which it was based and the changes anticipated before the next report issued four hours later.

The Germans distributed reports of meteorological conditions by wireless as early as 1916. At first, the information was mainly a statement of conditions in the upper air at Bruges, and this was received by the British meteorological service and utilised in connection with other reports, the observations of temperature and humidity at different heights being regarded as the most valuable data in the messages. Later on, German reports were issued by wireless from several bases and an examination of the reports issued in 1918 indicated that they had adopted the British system of ballistic winds and temperature; but it also showed that changes of wind were usually anticipated by the British service two to four hours earlier than by the German service, so that the British gunners were better served in this respect than the German.

III.—The Existing Forecast System of Western Europe, and the Construction of Weather Charts.

The principal features of the existing system of forecasting may be outlined as follows:—

1. A network of observing stations exists at which coastguards, lighthouse keepers, schoolmasters, clergymen, and others, make observations two, three or four times daily at 0100, 0700, 1300 or 1400, 1800, and transmit their observations, either immediately or with those for the following time of observation, by telegraph to a national headquarters.

These reports are made in a simple code consisting essentially of two five-figure groups, in which the barometer (three figures), the wind (three figures) and the temperature (2 figures) are given as accurately as the observations permit; of the remaining two figures, one is utilised for reporting the weather at the time of observation and the other for indicating the direction of motion of upper cloud or the weather since the preceding report, according to the time at which the report is made.

These two fundamental groups are supplemented invariably in the more advanced countries by a third group giving the character and magnitude of the barometric change in the three hours preceding the time of the report (three figures); the remaining two figures of this

group are allotted to rainfall in reports at 0700 and for varying purposes in reports at other hours. There is a further supplementary group at 0700 giving the maximum and minimum temperature (four figures) and the sea disturbance (one figure).

This is the so-called "old international system," introduced after a congress at Utrecht in 1874 and modified at Berlin 1910 and at Rome 1913. It is still used for the exchange of reports between different countries, though many services have introduced additional information into their reports for national purposes;

2. This network of semi-official stations is supplemented by a few observatories at which fuller records are maintained, but the reports are usually in the same code as those from the semi-official stations. Reports of the wind obtained by observation of small free balloons are, however, often added once or twice daily when weather conditions permit the balloon to be watched to a reasonable height by the special theodolite used for this work.

3. The reports referred to in 1 and 2 are collected at the central office and transmitted, usually by air-line or cable, but in a rapidly increasing number of cases by wireless, to other national central offices.

4. The home and foreign reports obtained as described are decoded at the central office, tabulated and charted. The fundamental reason for charting the observations is well stated by the astronomer Halley in presenting to the Royal Society in 1686 an account of the trade winds. He says: "To help the Conception of the Reader in a Matter of so much Difficulty, I believed it necessary to adjoyn a Scheme, showing at one View all the various Tracts and Courses of these Winds: whereby 'tis possible the Thing may be better understood than by any verbal Description whatsoever."

The charts of the present day portray the pressure, the temperature and the weather, as well as the wind and the character of the changes of pressure in progress, while supplementary charts indicate the distribution of cloud, of upper wind, of visibility and of the weather since the last report. The fundamental chart remains that of pressure, wind and weather.

No two charts for an extensive region are alike, but a brief examination of a series of charts shows that some features in the distribution of pressure are always recurring and are accompanied by weather of the same general character. Most prominent are regions of low and high pressure in which the isobars form closed curves. These are called cyclones and anti-cyclones respectively. The term cyclone was introduced by Piddington about 1846 in connection with the circular storms of the Bay of Bengal and Indian Ocean. It has been generally adopted, but is now used to denote the more extensive but less intense depressions of temperate latitudes, while Piddington's cyclones are frequently distinguished as "tropical." The term "anti-cyclone" was introduced in 1863 by the famous meteorologist and anthropologist, Francis Galton, author of *Meteorografica*.

Broadly speaking, in an anticyclone quiet, rainless weather prevails; the sky may be overcast or it may be cloudless, and different parts of the same anticyclone may be different in this respect; but wherever the cloud exists there is practically always an increase of temperature just above its upper limit. There are, however, exceptions to this general rule of rainless weather and occasionally quite heavy rain occurs in some

part of an anticyclonic region. In cyclones, on the other hand, the weather is usually unsettled and windy: rain does not fall over the whole area, but very few cyclones are free from rain in some parts.

The charts prepared at the central office are compared with the immediately preceding charts and with similar distributions in previous years, the latter comparison being partly conscious and partly sub-conscious. The well-known relation between the wind and the pressure distribution is considered and the effects of radiation and temperature differences, horizontally and vertically, are taken into account and a forecast prepared of the changes in the distribution of wind, weather temperature, cloud and visibility. All this is done at the central office and the accuracy with which the trained expert can balance the evidence and arrive at a definite judgment is surprising.

5. The principal weakness of the system is its onesidedness: the organisation is practically devoted to the collection and analysis of the reports: the distribution of the information after it leaves the central office is in non-professional hands. This weakness was recognised before the war and the need for local distributing centres was pressed, but funds were not available for their establishment. A concurrent and consequent weakness is the inability of a central forecasting office to estimate and allow for the variety of detail which characterises the weather of a sub-area: the central office inevitably generalises the weather of an area: the local forecaster is able, on the other hand, to concentrate his whole attention on the weather of his area and to emphasise the important details. It might be thought that this could be remedied by allocating different areas to different forecasters at headquarters, but in practice this would involve a vast centralisation of local reports and it would ignore the fact that a forecaster is human and feels the keenest interest in the weather of the region which he occupies. A further defect in the existing system is the lack of differentiation between the requirements of meteorological exchange between neighbouring countries and the exchange between countries long distances apart. In the next section an indication will be given of the manner in which these defects are likely to be remedied. It remains to add here that in pre-war meteorology wireless was used mainly for collecting reports from ships in the Atlantic; practically the only collective reports issued were those from the Eiffel Tower at 1000 and 1700 G.M.T. At the present time collective reports are being issued by wireless all over the world. The leading ones in Europe are: Eiffel Tower, Air Ministry, Scheveningen, Warsaw, Prague, Nauen (Berlin), Copenhagen.

IV.—Future Developments.

The general plan is outlined in its meteorological aspect in Annex G of the Convention relating to International Air Navigation [Peace Conference, Paris, 1919]. The necessary auxiliary wireless arrangements are set out in a communication by Colonel Blandy, D.S.O., R.A.F., to a conference of meteorologists of the British dominions in London, September, 1919.

A summary of the schemes, with slight modifications, is given here.

First, international hours of observation for the reports, on which synoptic charts are to be based are selected on the principle that they should be frequent enough for all practical purposes and so chosen that

they could be adopted all over the world with the minimum alteration of existing times of report. The hours selected are 0100, 0700, 1300, 1900 Greenwith Mean Time.

Secondly, the symbols or letters for use in specifying meteorological codes are set out and defined so that they can be used everywhere with a single definite meaning. They are as follows :—

BBB = Barometer reduced to sea-level and expressed in millibars and tenths—*i.e.*, corrected for temperature, gravity, and index error. Initial 9 or 10 omitted.

BB = Barometer reduced to sea-level and expressed in *whole* millibars. Initial 9 or 10 omitted.

DD = Direction of wind (true direction, as distinguished from magnetic) at a height of 10–15 metres above the surface, expressed on scale 1–72 [18 = east, 36 = south, etc.]. The code number multiplied by 5 gives the direction in degrees, measured from true north.

F = Force of wind on Beaufort Scale (wind above force 9 to be specially noted at end of telegram).

ww = Present weather (special code).

TT = Temperature in degrees.

T_1T_1 = Temperature of sea.

A = Form of low cloud [cumulus, nimbus, stratus, etc.].

L = Amount of low cloud [in tenths of sky covered, amount 10 telegraphed as 0].

B = Form of medium or high cloud [cirrus, alto-cumulus, etc.].

M = Amount of medium or high cloud, in tenths.

h = Height of base of low cloud.

WW = Weather since preceding report (special code).

V = Visibility (special code).

H_1 = Relative humidity (special code).

S = State of sea.

S_1 = State of swell and character of waves.

K = Direction of swell.

β = Characteristic of barometric tendency.

bb = Amount of barometric tendency in half-millibars per 3 hours : 50 added for negative tendencies.

RR = Rainfall in millimetres and tenths since last report,

MM = Maximum temperature in day.

mm = Minimum temperature in night.

t = Number of hours before time of report at which rain or snow or sleet began.

X = Reserve figure.

Special Symbols for Upper Air Reports.

Wind.

H = Height above ground.

DD = Direction (as above 1–72).

VV = Speed in kilometres per hour (for speeds above 99 km./hr. three figures to be used).

Pressure, Temperature, and Humidity.

p = Pressure.

TT = Temperature (as above).

HH = Relative humidity percentage.

To these must be added the symbols for specifying the position of a reporting ship at sea :—

oLLLL = North latitude (degrees and minutes).
5LLLL = South latitude (degrees and minutes).
lllll = West longitude (degrees and minutes).
5llll = East longitude (degrees and minutes), up to 99° 59′ E.
6llll = East longitude (degrees and minutes), 100° to 180° E.

Thirdly, forms of report from individual stations or ships are chosen so that they will give the requisite information about the meteorological conditions at each place and will be readily incorporated in collective reports for transmission from local centres to national headquarters, and from national headquarters to distributive centres and to other national headquarters.

They are as follows, where each letter is replaced in actual reports by the appropriate figure giving the conditions at the time and place of report :—

(*a*) *Reports for Synoptic Charts. Land Stations.*

BBBDD FwwTT βbbS$_1$S ALBMh WWVH$_1$t RRMMX (or RRmmX).

(*b*) *Reports for Synoptic Charts. Ships at Sea.*

oLLLL lllll BBBDD FwwTT T$_1$T$_1$KS$_1$S ALBMh WWVH$_1$X.

(*c*) *Reports of Wind and Weather at Auxiliary Land Stations or for Hourly Reports from Stations on Aerial Routes.*

DDFS$_1$S ALBMh wwWWV.

These three forms of report, (*a*), (*b*), (*c*), are to be used in exactly the same form for collective messages : the information for each place or ship is preceded by a call sign for the station or ship in order to prevent any risk of mistake as to the place to which the information refers ; such mistakes are easily made if groups of figures are sent according to a fixed order of stations, especially when part of the collective message fails.

For collective reports of Class 1 the forms (*a*) and (*b*) are used. These reports therefore give full details for synoptic charts and for printed Daily Weather Bulletins.

For collective reports of Class 3 the form (*c*) is used. These therefore give the necessary local information to supplement the national synoptic chart: and all that is required for aeroplane services on fixed routes.

For collective reports of Class 2 the following form is used :—

BBDDF wwTTh ALβbb,

the information for each place being preceded by the appropriate call sign.

These reports are intended for use in countries separated by long distances from the issuing country, *e.g.*, England and Italy, France and America.

It is not necessary that a meteorological office at Rome should have all the details of the meteorological conditions in the British Isles ; but it is essential that it should have sufficient information to make a general synoptic chart and to know in broad outline what the distribution of weather is. It is further necessary that the meteorological

office at Rome should know what the meteorological expert in London anticipates will be the weather changes in the next 10 to 20 hours. Accordingly, provision is made for the inclusion in collective reports of Class 2 of a brief forecast for each country whose reports are given in the message.

If different central offices are, for a moment, denoted by letters P, Q, R, . ., and the different *local* centres in each country are denoted by letters with suffixes, P_1, P_2, P_3, . . Q_1, Q_2, Q_3, ..., then, under the scheme outlined, the following information will be available :—

At each central office P :—

(i.) Full reports for a selection of stations in each of the countries, P, Q, R . . within a radius of 1,500 kilometres.

(ii.) Abbreviated reports for all countries, P, Q, R . ., within a radius of 5,000 kilometres.

(iii.) Details of wind and weather for all sub-areas, P_1, P_2, . ., Q_1, Q_2, within a radius of 500 kilometres.

(iv.) A 10 to 20-hour forecast for each country, P, Q, R. . . .

(v.) A short forecast covering 5 to 10 hours for every sub-area, P_1, . ., P_2, P_3 . ., in country P, and for sub-areas in other countries within a radius of 500 kilometres.

At each local centre P_1 . . :—

(i.) Full synoptic charts for country P and neighbouring countries of the group.

(ii.) Full details for sub-area P_1 and all contiguous sub-areas.

(iii.) Forecasts for short periods for sub-area P_1 and contiguous sub-areas.

(iv.) National forecasts for 24 hours or more for country P.

The principal features of the codes referred to in the above definition of symbols are as follows :—

Two figures (01–99) are used to denote the weather conditions and provision is made for indicating the character and intensity of precipitation, *e.g.*, thick drizzle, slight snow, moderate rain, heavy rain, passing hail showers, continuous heavy snow.

Four figures are used to indicate the forms of cloud and the amounts of different forms present.

One figure is used to denote the height of the lowest cloud present.

One figure is used to denote the degree of relative humidity.

One figure is used for the visibility.

One figure is allocated to report the swell of the sea, and simultaneously to indicate whether the waves are breaking or are not breaking.

One figure is used to indicate the time at which precipitation began to fall.

All this information is additional to that given hitherto in telegraphic reports, and represents the meteorologist's advance in dealing with the problem of furnishing accurate weather reports.

The "communications" arrangements are briefly as follows :—

In each country the national arrangements for collecting and distributing information for national purposes is left to the nation concerned—telegram, telephone, and wireless will probably all be used. Communication to aeroplanes in the air will be by wireless telephony, and usually in plain language from the decoded reports of Class (*c*).

For collective reports of Class 3 each country will also make its own arrangements; but, as these will frequently be hourly reports for use on aerial routes, neighbouring countries will be kept informed of details as to times of transmission and wave-lengths. For example, from Great Britain to France such transmission is already being made on a wave-length of 1,400 m. at each hour from 0745 to 1445.

For other collective reports the following groups and sub-groups of countries have been arranged :—

A1. British Isles.
A2. Iceland, Denmark, Norway, Sweden.
A3. Archangel, Esthonia, Finland.
B1. France, Belgium, Holland.
B2. Spain, Portugal.
B3. French North Africa.
B4. Switzerland.
C1. Italy, Malta, Serbia.
C2. Egypt, Libya, Palestine.
C3. Greece, Roumania, Constantinople
C4. Poland, Bohemia.
D1. Germany.
D2. Austria.
D3. Russia in Europe.
E. Africa (not included under B and C).
F. North America.

For collective reports, Class 1, the different sub-groups will transmit according to the following scheme :—

Observations made at 0100.

Wave-lengths ..	4,200	3,900	3,700	3,500
Times of Issue.				
0230	Group A1.	Group B1.	Group C1.	Group D1
0245	Group A2.	Group B2.	Group C2.	Group D2.
0300	Group A3.	Group B3.	Group C3.	Group D3.
0315	—	Group B4.	Group C4.	—

A similar procedure will be followed for observations at 0700, 1300, 1900. This permits 1½ hours as a minimum, for the national collection of observations and the preparation of the collective message.

Collective reports, Class 2, are to be transmitted from four main transmitting stations in Europe as follows :—

Group A.	Stavanger	Wave-length, 9,500.
Group B.	Lyons	Wave-length, 15,500.
Group C.	Rome	Wave-length, 10,850.
Group D.	Nauen	Wave-length, 12,600.
Group E.	—	—
Group F.	Annapolis (?)	Wave-length, 16,000.

These reports will be transmitted simultaneously at 0400, 1000, 1600, 2200, by G.M.T.—*i.e.*, three hours after the times of observation and forty-five minutes after the latest time for the transmission of the Class 1 reports for the corresponding hour of observation. The punctual issue of these reports will depend on the time-table for Class 1 reports being strictly adhered to.

It is seen that when this scheme is working it will be possible to make a synoptic chart for the area extending in longitude from Vancouver to the Ural Mountains, and in latitude from the Equator to the Arctic Circle; and to complete it within four hours of the time of observation. This should furnish all that is required meteorologically for navigation of airships in the area concerned, and should put the meteorologist in the position to give general forecasts for three or four days ahead at least on the majority of occasions, especially for areas less critically situated than the British Isles.

There is one further development in which wireless telegraphy is going to be of the greatest assistance to meteorology. Great progress has been made in recording atmospherics and the direction from which they come. Already it has proved possible with a single station to say with confidence that there was practically no risk of thunderstorms on a particular route, although thunderstorms were indicated in other directions in the region in which the station was situated. A wireless direction finder for thunderstorms can now be made with a coil about 5 ft. by 4 ft., rotated about a vertical axis until the position of minimum intensity is found. The sensitiveness of this detector used with thermionic valves is remarkable, and it is a relatively inexpensive instrument. It is almost certain to prove an indispensable part of the instrumental equipment of every local meteorological centre. When that is achieved it will probably prove feasible to follow the path of each thunderstorm and to devise a method of advising airships and aeroplanes *en voyage* of the course to be taken to avoid thunderstorms during periods of thunderstorm weather. The use of atmospherics in meteorology is practically in the embryo stage at present; he would be a bold man who set limits to the developments which may come when these form part of the collective information at the disposal of the headquarters expert.

WIRELESS AND TIME

By Arthur R. Hinks, M.A., F.R.S., Secretary of the Royal Geographical Society.

AT the outbreak of war there was in progress a new determination of the difference of longitude between Paris and Saint Petersburg, as it then was ; or, more precisely, between Paris and the Imperial observatory of Pulkovo. To-day we know no more of that famous observatory than that it has been under the " direction " of two Bolshevik soldiers ; that the recent fighting between the Reds and the forces of Denikin has swayed backwards and forwards over the hill on which the observatory stands, or stood ; and that there is only too much reason to fear for the survival of what was the most renowned institution of its kind : the national observatory, whose first concern is with the very fundamentals of astronomy. The wireless determination of the Paris-Pulkovo longitude was an important step in that revision of the primary longitudes of Europe required by the ever-increasing demands of Geodesy, that is no longer content with the earth as a spheroid of revolution, but must examine afresh with all possible refinement the discordances between the astronomical and the geodetic, or between the wireless and the surveyed differences of longitude, in order to determine those anomalies of the vertical, that is, of the direction of gravity, that are essential to the construction of the " geoid."

During the years of war astronomers and surveyors have turned to less fundamental, but more imperative, needs. The escorts of armoured cars have lain out all night under arms in the deserts of Arabia, Egypt, and Mesopotamia, while astronomers with temporary commissions in the Royal Engineers have " counted the stars," or determined time and latitude, with time signals from the Eiffel Tower or, what amused them more, from Nauen for the derivation of the longitude. Thanks to wireless, it is now, for the first time, possible to place the Hedjaz railway accurately on the map of Arabia ; and the methods of desert reconnaissance survey under conditions of war have been wonderfully developed by the Survey of Egypt ; while the longitudes of the surveys in Mesopotamia depend on the time signals from the central wireless station at Basra. Very little has been published as yet on the technical experiences of these survey parties, and perhaps there is not much to tell, for we know from the reports of Cav. De Filippi's expedition in the Karakorum in 1913 that the field determination of longitude by wireless offers no particular difficulty. Geographers will, however, be anxious to know more of the possibilities of valves worked with primary batteries, and of the use of growing trees as aerials in the manner developed by the United States Signal Service. The latter method appeals especially to the surveyor in the forests of the Amazon or the Congo. Dr. Hamilton Rice, on the Amazon, found at first much difficulty in hoisting his aerial in the forest. He has just returned to that river for a further tour of exploration and survey, and we may hope to learn much of the possibilities of turning the forest to good account in the new method.

The surveyor, who can hardly be expected to follow the rapid transformation of wireless ideas and their somewhat bewildering technique, would be grateful for a little dogmatic advice on such questions as the relative efficiency of tall aerials and coils, and the saving of weight to be carried which may be effected by the latter. When a single traveller, with no skilled assistance, can set up his wireless gear in a few minutes, then we shall have, indeed, the long-desired revolution in methods of desert survey, to which the excellent work of the French in the Sahara pointed the way, and the work of our surveyors in the Eastern warfare has doubtless contributed much.

There is an important point in these astronomical determinations of position that must not be overlooked : they are affected by any abnormalities in the direction of the vertical, of which we have spoken above. Owing partly to the attraction of visible masses above the sea level, but often much more to invisible excesses or defects of density below, the direction of gravity is displaced from the normal to the theoretical figure of revolution which is the " figure of the earth " to which all survey calculations are referred. In consequence of such abnormalities, the distance between two stations determined astronomically from their latitudes and longitudes will not agree very closely with the distance determined by the ordinary survey methods of base measurement and triangulation. In very mountainous regions the differences thus created between the two classes of measures, the geodetic and the astronomical, may amount to a considerable part of a minute of arc, or nautical mile ; and a single astronomical point may be very visibly out of accordance with surrounding points determined by triangulation. Such discordances would play havoc with a large-scale cadastral survey, in which areas are all-important, and nothing can replace triangulation for work of this type. On the other hand, astronomical determinations are often easy just where triangulation is practically impossible, as in flat deserts. Hence we shall have inevitable discordances where the triangulation meets the desert survey by astronomical positions that wireless has so much improved. But this discordance is not all loss, for the information thus obtained will be essential in a general discussion of the abstruse problems of the real shape of the level surface, which are of the greatest scientific interest, though, perhaps, of not much practical importance at present.

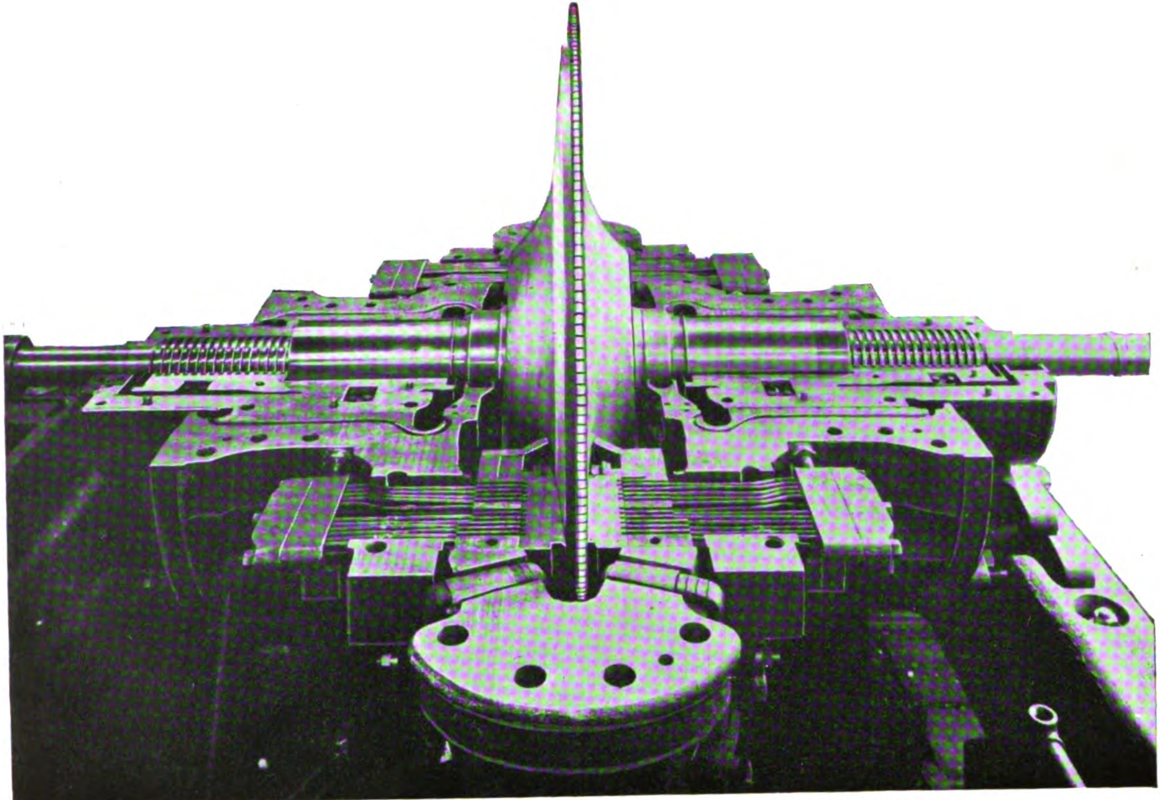
So much for the use of time signals in land survey of the large scale. Their use in navigation has become a commonplace, and they must have done much to relieve the strain on the supply of chronometers caused by the great expansion of our Navy during the war, added to the serious destruction both in naval actions and in the sinking of merchant ships. As to the use of directional wireless in hydrographic surveys, it has a serious competitor in submarine sound ranging, and we may suspect that the latter, about which scarcely anything has been published, is the more accurate at present. There is, however, this consolation for the wireless enthusiast, that sound, with its insignificant speed of five seconds for a mile in air, and one second in water, is much more readily delayed or destroyed by local circumstance than is the almost infinitely rapid wireless wave, to which the future assuredly belongs.

A natural corollary of the extension of time signals is the use of " standard time " afloat, as well as on shore. But the introduction of this reform was not made in the Navy without some hesitation, and

will not be wholeheartedly adopted in the mercantile marine without some persuasion. We shall find it worth while, therefore, to give some space this year to the examination of a matter which is not quite so simple as it appears on the surface, and is of very great importance to the future of wireless inter-communication. The credit of the first effective move belongs to the distinguished hydrographer of the French Navy, Monsieur J. Renaud, who has published in the *Annuaire* of the *Bureau des Longitudes* for 1918 an excellent summary of the reasons which led to the employment of standard time in the French and Italian navies, and thus to the British Hydrographer's Conference of 1917.

"Although," says M. Renaud, "the ocean covers nearly three-quarters of the surface of the globe, the question of time has almost always been treated without reference to the life of the seafarer." Nearly all civilised countries have fixed by law the time shown on their public clocks, but the International Time Conference, which met at Paris in October, 1912, gave no attention at all to the question of the time at sea. Yet precise knowledge of the time of events recorded at sea is important, whether in public business or in scientific affairs, especially in meteorology. On land we have arrived by gradual steps, first, at the use of mean time instead of apparent solar time; then at the use of one uniform mean time throughout a country; and, finally, at the use in most countries of "standard time," based on that of the meridian of Greenwich, and differing from Greenwich mean time by an exact number of hours, with the ultimate intent that all clocks throughout the land surface of the world shall show the same minutes and seconds, and differ only in the hours. Meanwhile the sailor has continued in the primitive condition of keeping local apparent time, more or less, putting the ship's clock to this at noon, and keeping it to this setting until the next noon, though all the time the longitude is changing. Such was the rule, but by no means always the practice. Cross-Channel services, or vessels on coasting voyages would often keep the time of the shore; trans-Atlantic passenger ships would make the large corrections needed in several parts each day, according to the captain's view of the convenience of his passengers or the requirements of the ship's routine. As the time was continually changing with the change of longitude, there was no particular inducement to keep it very accurately; and it is important to notice that the noon observation at sea gives the latitude, but not the time, except very roughly; and the instant of local noon is derived from the morning observation for time and longitude, combined with the dead reckoning of the ship.

It resulted from this process that the exact time of an event at sea could rarely be ascertained. It was recorded in hours and minutes of the ship's clock, with the position of the ship at the time, which data are insufficient. To convert the record into G.M.T. one must know either the longitude of the ship at noon when the clock was last adjusted, or the time at the place of record; and after the event these data were usually unobtainable. Moreover, there were many occasions in which this vagueness of time was inconvenient in the actual working of the ship: when, for example, it was required to take out from the Tide Tables the data required for entering port. Still more inconvenient was it when signals were made from ship to ship, especially when two fast ships going east and west passed in the north Atlantic: and the



SECTION OF A 200 K.W. ALEXANDERSON HIGH-FREQUENCY ALTERNATOR.

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great increase of intercommunication by wireless was the decisive factor in putting an end to all this uncertainty and risk of error.

The obvious reform was to introduce at sea the system of standard time, varying by exact hours from Greenwich Mean Time. This system is commonly, but unfortunately, known as "Zone Time" : unfortunately, because a zone is the area included between two parallels of latitude, not that between two meridians of longitude. The French have an excellent word, "*fuseau*," meaning spindle, for such an area, and divide the world into "*fuseaux horaires*." We can avoid the word zone in speaking of Standard Time ; but have nothing for it but to speak of an hour zone when we wish to describe the area in which one uniform hour is kept. The theory of hour zones is very simple. If Greenwich is to be the prime meridian, as is now universal, the zone of Greenwich time, or the zero zone, is bounded by the meridians 7½° east and west of Greenwich ; the zone of time one hour slow on Greenwich is included between the meridians 7½° and 22½° west, and so on round the world. In practice one modifies the zones a little as they approach the coasts, so as to conform to the standard times kept ashore, which sometimes, for convenience, exceed the strict limits of the zones, as in the north of Norway, where the time of central Europe is kept, one hour fast of Greenwich, though the longitude is nearly 30° east. The French Hydrographer published an excellent *Planisphère des Fuseaux horaires* to show the limits of these zones of convenience, and they have since been adopted without change by the British, on the recommendation of the British Hydrographer's Conference in 1917.

But in one respect the British have found themselves obliged to differ from the French : in numbering the zones. The French number the hour zones eastward from 0 to 23. To find the Greenwich Mean Time corresponding to the standard time of Zone 8 one subtracts 8 hours ; but in Zone 22 one must obviously add 24 hours before performing the subtraction, or the result will be a whole day wrong. Herein lies the one defect of the French system : it is not easy to provide for it giving infallibly the right day. The Zone 12 is divided into two parts by the 180th meridian, where the date should theoretically change ; but in practice it has been found convenient to draw a "Date line," which in places deviates considerably from this meridian. Through Bering Strait it is about 40 minutes of time east of the meridian, to preserve a uniform date for all Asia ; and a little to the south it is nearly as much west, to keep the American date for the Aleutian Islands. South of the Equator it diverges half an hour east, to bring Fiji and Chatham Island within the region of the Old World date ; and now that Samoa is to go under mandate to New Zealand, the line will presumably be altered, or Samoa will be a day behind her mandatory power.

The French method of numbering the zones did not, therefore, commend itself to the British conference ; which was of the opinion that the description of the zone should give the actual correction required to reduce the Zone Time to Greenwich Mean Time *and date*. It was therefore resolved that the zones west of the zero zone should be described as Plus 1, Plus 2, up to Plus 12 for that part of Zone 12 lying east of the date line (that is, the line described in the Admiralty Sailing Directions based on the 180th meridian, on crossing which, from east or west, the date must be advanced or put back one day respectively) ; and that the zones east of the zero zone should be described as Minus 1,

Minus 2, up to Minus 12 for that part of Zone 12 lying west of the date line. By this simple improvement—with which, we are glad to know, Monsieur Renaud is personally in sympathy—the complexity of the date-line change is removed, and Zone Time can be referred infallibly to G.M.T.

It is important to note that the Zone Time kept at any moment by a ship is not necessarily the time of the zone in which she actually is. The change of the ship's clock must be a whole hour, and it will depend on circumstances when this change can most conveniently be made with regard for the ship's routine. Further, a ship may be keeping summer time (though the Conference expressed the opinion that there is no advantage in doing so at sea), and in that case the zone description will be one less than the true number of the zone. The whole essence of the reform is that the time shall differ a whole number of hours from G.M.T., and that the correction to reduce it to G.M.T.—that is, the zone description—shall be recorded with the time. If that is done, it matters nothing to the accuracy of the record whether a ship is keeping the time of the zone in which she actually is or that of any other zone which may be convenient.

The Conference recommended, further, that Zone Time should be used for the immediate future in registering the receipt and dispatch of all wireless telegraph, telegraph, and visual messages; but was nevertheless of opinion that the most convenient time to adopt for all records of and reference to time in all messages throughout the world would be Greenwich Mean Time, and expressed the hope that this proposal might as soon as possible be brought before the various nations and bodies concerned.

During the continuance of the war special rules were in force for time-keeping in the Navy; but in the spring of last year an Admiralty order was issued which brought into use the system described above. The Marine Department of the Board of Trade had already, a year before, prepared the way for its introduction into the mercantile service by the issue of their Memorandum on Time-keeping at Sea, accompanied by a Time Zone Chart; and there is every reason to hope that in the course of a few months the new system will be universal in the British service. To neglect it would be to throw away wilfully a great part of the convenience that might otherwise be gained by the rapid development of wireless time services throughout the world.

There remains the task of persuading recalcitrant people ashore to follow the lead now given them by the sea. It is no credit to the British Empire that Newfoundland, British Guiana, and British East Africa should be coloured yellow on the Time Zone Chart, along with Abyssinia and Arabia and other backward countries. Nor is it very satisfactory to find Nigeria, British India, other than Calcutta (which is yellow), South Australia, and New Zealand coloured purple, to show their half-hearted adoption of standard times involving odd half-hours. However much one may dislike the principle of "daylight saving," it may at least be used as an argument against those who spoil the beauty of the system by insisting on the odd half-hours.

INTERNATIONAL TIME AND WEATHER SIGNALS

CURRENT ARRANGEMENTS.

BELOW are given particulars of the time and weather messages issued in different countries. Changes are in progress in the weather messages and the codes in which they are issued, but the following explanatory notes and specifications apply to the majority of those issued at present.

The standard group is represented symbolically by

BBBDD FWS

Here BBB = barometer reduced to sea-level and corrected for gravity. If the barometer reading is given in inches, the initial 2 or 3 is usually omitted and the values given to the nearest hundredth. If it is expressed in millimetres and tenths, the initial 7 is omitted. If it is expressed in millibars and tenths the initial 9 or 10 is omitted.

Readings in millimetres can be expressed in millibars by adding $\frac{1}{3}$—*e.g.*, 760 mm. = 760 + $\frac{1}{3}$ (760) = 760 + 253·3 = 1013·3 mb.

Similarly, readings in millibars can be expressed in millimetres by taking $\frac{3}{4}$ of the value—*e.g.*, 1000 mb. = $\frac{3}{4}$ (1000) = 750 mm.

DD = direction of wind according to the following code unless otherwise specified :—

02 =	N.N.E.	18 =	S.S.W.
04 =	N.E.	20 =	S.W.
06 =	E.N.E.	22 =	W.S.W.
08 =	E.	24 =	W.
10 =	E.S.E.	26 =	W.N.W.
12 =	S.E.	28 =	N.W.
14 =	S.S.E.	30 =	N.N.W.
16 =	S.	32 =	N.

For calm the figures 00 are used.

F = Force of wind on Beaufort scale specified as follows :—

For forces greater than 9 a special note is usually added at the end of a message.

W = Weather by following code :—

0 = fine, cloudless.
1 = less than half sky covered with cloud.
2 = about half sky covered with cloud.
3 = about three-quarters of sky covered with cloud.
4 = overcast.
5 = rain.
6 = snow.
7 = mist (not *wet* fog, but fog less thick than for 8).
8 = fog.
9 = thunderstorm.

S = state of the surface of the sea :—

0 = calm—glassy.
1 = very smooth—slightly rippled.
2 = smooth—rippled.
3 = slight—rocks buoy.
4 = moderate—furrowed—choppy.
5 = rather rough—much furrowed.
6 = rough—deeply furrowed.
7 = high—rollers with steep fronts.
8 = very high—rollers with steep fronts.
9 = phenomenal—precipitous.

Fuller reports include also the temperature TT, the barometric characteristic β and the tendency bb. A conversion table from degrees Absolute to degrees Fahrenheit and *vice versa* is given in Table I. Degrees Centigrade are obtained from degrees Absolute by subtracting 273.

For reports of visibility V the following is the standard telegraphic code :—

Code figure.

0 =	objects not visible at 50 metres.					
1 =	objects visible at	50 metres	but not at	200 metres.		
2 =	,, ,,	200	,, ,,	1,000	,,	
3 =	,, ,,	1,000	,, ,,	2,000	,,	
4 =	,, ,,	2,000	,, ,,	4,000	,,	
5 =	,, ,,	4,000	,, ,,	7,000	,,	
6 =	,, ,,	7,000	,, ,,	12,000	,,	
7 =	,, ,,	12,000	,, ,,	20,000	,,	
8 =	,, ,,	20,000 or more.				
9 =	,, ,,	30,000 and exceptionally clear air.				

For reports of barometric tendency the characteristic β has the following significance for the period of 3 hours preceding the time of observation :—

0 = barometer steady.
1 = ,, unsteady.
2 = ,, rising continuously.
3 = ,, falling continuously.
4 = ,, falling then rising.
5 = ,, steady then rising
6 = ,, steady then falling.
7 = ,, falling then steady.
8 = ,, rising then steady or falling.
9 = ,, *sudden* rise with marked change of wind and weather.

The amount of change or tendency bb is expressed in ½ millibars in British reports, in tenths of millimetres where millimetres are used for barometer. For negative values of the tendency 50 is added in British units to the actual numerical value of bb ; where millimetres are used negative values are usually indicated by adding 50 to the wind direction DD.

Table I.—Temperature. ***Degrees Absolute to Degrees Fahrenheit.***
The equations are $A = 273 + \frac{5}{9}(F - 32)$, $F = 32 + \frac{9}{5}(A - 273)$.

Degrees Absolute.	0	1	2	3	4	5	6	7	8	9
	Degrees Fahrenheit.									
250	− 9·4	− 9·2	− 9·0	− 8·9	− 8·7	− 8·5	− 8·3	− 8·1	− 8·0	− 7·8
251	− 7·6	− 7·4	− 7·2	− 7·1	− 6·9	− 6·7	− 6·5	− 6·3	− 6·2	− 6·0
252	− 5·8	− 5·6	− 5·4	− 5·3	− 5·1	− 4·9	− 4·7	− 4·5	− 4·4	− 4·2
253	− 4·0	− 3·8	− 3·6	− 3·5	− 3·3	− 3·1	− 2·9	− 2·7	− 2·6	− 2·4
254	− 2·2	− 2·0	− 1·8	− 1·7	− 1·5	− 1·3	− 1·1	− 0·9	− 0·8	− 0·6
255	− 0·4	− 0·2	0·0	+ 0·1	+ 0·3	+ 0·5	+ 0·7	+ 0·9	+ 1·0	+ 1·2
256	+ 1·4	+ 1·6	+ 1·8	1·9	2·1	2·3	2·5	2·7	2·8	3·0
257	3·2	3·4	3·6	3·7	3·9	4·1	4·3	4·5	4·6	4·8
258	5·0	5·2	5·4	5·5	5·7	5·9	6·1	6·3	6·4	6·6
259	6·8	7·0	7·2	7·3	7·5	7·7	7·9	8·1	8·2	8·4
260	8·6	8·8	9·0	9·1	9·3	9·5	9·7	9·9	10·0	10·2
261	10·4	10·6	10·8	10·9	11·1	11·3	11·5	11·7	11·8	12·0
262	12·2	12·4	12·6	12·7	12·9	13·1	13·3	13·5	13·6	13·8
263	14·0	14·2	14·4	14·5	14·7	14·9	15·1	15·3	15·4	15·6
264	15·8	16·0	16·2	16·3	16·5	16·7	16·9	17·1	17·2	17·4
265	17·6	17·8	18·0	18·1	18·3	18·5	18·7	18·9	19·0	19·2
266	19·4	19·6	19·8	19·9	20·1	20·3	20·5	20·7	20·8	21·0
267	21·2	21·4	21·6	21·7	21·9	22·1	22·3	22·5	22·6	22·8
268	23·0	23·2	23·4	23·5	23·7	23·9	24·1	24·3	24·4	24·6
269	24·8	25·0	25·2	25·3	25·5	25·7	25·9	26·1	26·2	26·4
270	26·6	26·8	27·0	27·1	27·3	27·5	27·7	27·9	28·0	28·2
271	28·4	28·6	28·8	28·9	29·1	29·3	29·5	29·7	29·8	30·0
272	30·2	30·4	30·6	30·7	30·9	31·1	31·3	31·5	31·6	31·8
273	32·0	32·2	32·4	32·5	32·7	32·9	33·1	33·3	33·4	33·6
274	33·8	34·0	34·2	34·3	34·5	34·7	34·9	35·1	35·2	35·4
275	35·6	35·8	36·0	36·1	36·3	36·5	36·7	36·9	37·0	37·2
276	37·4	37·6	37·8	37·9	38·1	38·3	38·5	38·7	38·8	39·0
277	39·2	39·4	39·6	39·7	39·9	40·1	40·3	40·5	40·6	40·8
278	41·0	41·2	41·4	41·5	41·7	41·9	42·1	42·3	42·4	42·6
279	42·8	43·0	43·2	43·3	43·5	43·7	43·9	44·1	44·2	44·4
280	44·6	44·8	45·0	45·1	45·3	45·5	45·7	45·9	46·0	46·2
281	46·4	46·6	46·8	46·9	47·1	47·3	47·5	47·7	47·8	48·0
282	48·2	48·4	48·6	48·7	48·9	49·1	49·3	49·5	49·6	49·8
283	50·0	50·2	50·4	50·5	50·7	50·9	51·1	51·3	51·4	51·6
284	51·8	52·0	52·2	52·3	52·5	52·7	52·9	53·1	53·2	53·4
285	53·6	53·8	54·0	54·1	54·3	54·5	54·7	54·9	55·0	55·2
286	55·4	55·6	55·8	55·9	56·1	56·3	56·5	56·7	56·8	57·0
287	57·2	57·4	57·6	57·7	57·9	58·1	58·3	58·5	58·6	58·8
288	59·0	59·2	59·4	59·5	59·7	59·9	60·1	60·3	60·4	60·6
289	60·8	61·0	61·2	61·3	61·5	61·7	61·9	62·1	62·2	62·4
290	62·6	62·8	63·0	63·1	63·3	63·5	63·7	63·9	64·0	64·2
291	64·4	64·6	64·8	64·9	65·1	65·3	65·5	65·7	65·8	66·0
292	66·2	66·4	66·6	66·7	66·9	67·1	67·3	67·5	67·6	67·8
293	68·0	68·2	68·4	68·5	68·7	68·9	69·1	69·3	69·4	69·6
294	69·8	70·0	70·2	70·3	70·5	70·7	70·9	71·1	71·2	71·4
295	71·6	71·8	72·0	72·1	72·3	72·5	72·7	72·9	73·0	73·2
296	73·4	73·6	73·8	73·9	74·1	74·3	74·5	74·7	74·8	75·0
297	75·2	75·4	75·6	75·7	75·9	76·1	76·3	76·5	76·6	76·8
298	77·0	77·2	77·4	77·5	77·7	77·9	78·1	78·3	78·4	78·6
299	78·8	79·0	79·2	79·3	79·5	79·7	79·9	80·1	80·2	80·4
300	80·6	80·8	81·0	81·1	81·3	81·5	81·7	81·9	82·0	82·2
301	82·4	82·6	82·8	82·9	83·1	83·3	83·5	83·7	83·8	84·0
302	84·2	84·4	84·6	84·7	84·9	85·1	85·3	85·5	85·6	85·8
303	86·0	86·2	86·4	86·5	86·7	86·9	87·1	87·3	87·4	87·6
304	87·8	88·0	88·2	88·3	88·5	88·7	88·9	89·1	89·2	89·4
305	89·6	89·8	90·0	90·1	90·3	90·5	90·7	90·9	91·0	91·2
306	91·4	91·6	91·8	91·9	92·1	92·3	92·5	92·7	92·8	93·0
307	93·2	93·4	93·6	93·7	93·9	94·1	94·3	94·5	94·6	94·8
308	95·0	95·2	95·4	95·5	95·7	95·9	96·1	96·3	96·4	96·6
309	96·8	97·0	97·2	97·3	97·5	97·7	97·9	98·1	98·2	98·4
310	98·6	98·8	99·0	99·1	99·3	99·5	99·7	99·9	100·0	100·2

SPECIFICATION OF THE BEAUFORT SCALE WITH

Beaufort Number.	Admiral Beaufort's General Description of Wind.	Admiral Beaufort's Specification 1805.		Description of Wind.	Mode of Estimating aboard Sailing Vessels.
0	Calm	Calm		—	—
1	Light air ..	Just sufficient to give steerage way.		Light breeze	Sufficient wind for working ship.
2	Slight breeze	That in which a well-conditioned man-of-war, with all sail set and "clean full," would go in smooth water from	1 to 2 knots.	Light breeze	Sufficient wind for working ship.
3	Gentle breeze		3 to 4 knots.	Light breeze	Sufficient wind for working ship.
4	Moderate breeze		5 to 6 knots.	Moderate breeze.	Forces most advantageous for sailing with leading wind and all sail drawing.
5	Fresh breeze..	That to which she could just carry in chase "full and by."	Royals, etc...	Moderate breeze.	Forces most advantageous for sailing with leading wind and all sail drawing.
6	Strong breeze		Single-reefed topsails or top-gallant sails.	Strong wind	Reduction of sail necessary with leading wind.
7	Moderate gale (*High wind*)*		Double-reefed topsails, jib, etc.	Strong wind	Reduction of sail necessary with leading wind.
8	Fresh gale .. (*Gale*)*		Triple-reefed topsails, etc.	Gale forces	Considerable reduction of sail necessary even with wind quartering.
9	Strong gale ..		Close-reefed topsails and courses.	Gale forces	Considerable reduction of sail necessary even with wind quartering.
10	Whole gale ..	That with which she could scarcely bear close-reefed main topsail and reefed foresail.		Storm forces	Close reefed sail running, or hove to under storm sail.
11	Storm ..	That which would reduce her to storm stay-sails.		Storm forces	Close reefed sail running, or hove to under storm sail.
12	Hurricane ..	That which no canvas could withstand.		Hurricane ..	No sail can stand even when running.

* It has been decided that for statistical purposes winds of force less than 8 shall not be counted as gales, and to avoid the ambiguity implied by the use of the term "moderate gale" for force 7 the Beaufort description has been modified by the substitution of the descriptions in italics for forces 7 and 8.

EQUIVALENTS OF THE NUMBERS OF THE SCALE.

Beaufort Number.	Specification of Beaufort Scale. For Coast Use.	Specification of Beaufort Scale. For Use on Land.	Mean wind force in lb. per sq. ft. at standard density.	Equivalent velocity in miles per hour.	Limits of Velocity.
0	Calm	Calm; smoke rises vertically.	0	0	Less than 1
1	Fishing smack* just has steerage way.	Direction of wind shown by smoke drift, but not by wind vanes.	·01	2	1–3
2	Wind fills the sails of smacks, which then move at about 1–2 miles per hour.	Wind felt on face; leaves rustle; ordinary vane moved by wind.	·08	5	4–7
3	Smacks begin to careen, and travel about 3–4 miles per hour.	Leaves and small twigs in constant motion; wind extends light flag.	·28	10	8–12
4	Good working breeze; smacks carry all canvas, with good list.	Raises dust and loose paper; small branches are moved.	·67	15	13–18
5	Smacks shorten sail ..	Small trees in leaf begin to sway; crested wavelets form on inland waters.	1·31	21	19–24
6	Smacks have double reef in main sail. Care required when fishing.	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.	2·3	27	25–31
7	Smacks remain in harbour, and those at sea lie to.	Whole trees in motion; inconvenience felt when walking against wind.	3·6	35	32–38
8	All smacks make for harbour if near.	Breaks twigs off trees; generally impedes progress.	5·4	42	39–46
9	—	Slight structural damage occurs (chimney pots and slates removed).	7·7	50	47–54
10	—	Seldom experienced inland; trees uprooted; considerable structural damage occurs.	10·5	59	55–63
11	—	Very rarely experienced; accompanied by widespread damage.	14·0	68	64–75
12	—	—	Above 17·0	Above 75	Above 75

* The fishing smack in this column may be taken as representing a trawler of average type and trim. For larger or smaller boats and for special circumstances allowance must be made.

The following table enables inches to be put into millibars and *vice versa* :—

TABLE II.—PRESSURE.

Equivalents in Millibars of Inches of Mercury at 32° F. Lat. 45°.

Inches.	0	1	2	3	4	5	6	7	8	9
	Millibars.									
27·0	914·3	914·6	915·0	915·3	915·7	916·0	916·3	916·7	917·0	917·4
27·1	917·7	918·0	918·4	918·7	919·0	919·4	919·7	920·1	920·4	920·7
27·2	921·1	921·4	921·8	922·1	922·4	922·8	923·1	923·4	923·8	924·1
27·3	924·5	924·8	925·1	925·5	925·8	926·2	926·5	926·8	927·2	927·5
27·4	927·9	928·2	928·5	928·9	929·2	929·5	929·9	930·2	930·6	930·9
27·5	931·2	931·6	931·9	932·3	932·6	932·9	933·3	933·6	933·9	934·3
27·6	934·6	935·0	935·3	935·6	936·0	936·3	936·7	937·0	937·3	937·7
27·7	938·0	938·3	938·7	939·0	939·4	939·7	940·0	940·4	940·7	941·1
27·8	941·4	941·7	942·1	942·4	942·8	943·1	943·4	943·8	944·1	944·4
27·9	944·8	945·1	945·5	945·8	946·1	946·5	946·8	947·2	947·5	947·8
28·0	948·2	948·5	948·8	949·2	949·5	949·9	950·2	950·5	950·9	951·2
28·1	951·6	951·9	952·2	952·6	952·9	953·2	953·6	953·9	954·3	954·6
28·2	954·9	955·3	955·6	956·0	956·3	956·6	957·0	957·3	957·7	958·0
28·3	958·3	958·7	959·0	959·3	959·7	960·0	960·4	960·7	961·0	961·4
28·4	961·7	962·1	962·4	962·7	963·1	963·4	963·7	964·1	964·4	964·8
28·5	965·1	965·4	965·8	966·1	966·5	966·8	967·1	967·5	967·8	968·1
28·6	968·5	968·8	969·2	969·5	969·8	970·2	970·5	970·9	971·2	971·5
28·7	971·9	972·2	972·6	972·9	973·2	973·6	973·9	974·2	974·6	974·9
28·8	975·3	975·6	975·9	976·3	976·6	977·0	977·3	977·6	978·0	978·3
28·9	978·6	979·0	979·3	979·7	980·0	980·3	980·7	981·0	981·4	981·7
29·0	982·0	982·4	982·7	983·0	983·4	983·7	984·1	984·4	984·7	985·1
29·1	985·4	985·8	986·1	986·4	986·8	987·1	987·5	987·8	988·1	988·5
29·2	988·8	989·1	989·5	989·8	990·2	990·5	990·8	991·2	991·5	991·9
29·3	992·2	992·5	992·9	993·2	993·5	993·9	994·2	994·6	994·9	995·2
29·4	995·6	995·9	996·3	996·6	996·9	997·3	997·6	997·9	998·3	998·6
29·5	999·0	999·3	999·6	1000·0	1000·3	1000·7	1001·0	1001·3	1001·7	1002·0
29·6	1002·4	1002·7	1003·0	1003·4	1003·7	1004·0	1004·4	1004·7	1005·1	1005·4
29·7	1005·7	1006·1	1006·4	1006·8	1007·1	1007·4	1007·8	1008·1	1008·4	1008·8
29·8	1009·1	1009·5	1009·8	1010·1	1010·5	1010·8	1011·2	1011·5	1011·8	1012·2
29·9	1012·5	1012·8	1013·2	1013·5	1013·9	1014·2	1014·5	1014·9	1015·2	1015·6
30·0	1015·9	1016·2	1016·6	1016·9	1017·3	1017·6	1017·9	1018·3	1018·6	[illegible]
30·1	1019·3	1019·6	1020·0	1020·3	1020·6	1021·0	1021·3	1021·7	1022·0	1022·3
30·2	1022·7	1023·0	1023·3	1023·7	1024·0	1024·4	1024·7	1025·0	1025·4	1025·7
30·3	1026·1	1026·4	1026·7	1027·1	1027·4	1027·7	1028·1	1028·4	1028·8	1029·1
30·4	1029·4	1029·8	1030·1	1030·5	1030·8	1031·1	1031·5	1031·8	1032·2	1032·5
30·5	1032·8	1033·2	1033·5	1033·8	1034·2	1034·5	1034·9	1035·2	1035·5	1035·9
30·6	1036·2	1036·6	1036·9	1037·2	1037·6	1037·9	1038·2	1038·6	1038·9	1039·3
30·7	1039·6	1039·9	1040·3	1040·6	1041·0	1041·3	1041·6	1042·0	1042·3	1042·6
30·8	1043·0	1043·3	1043·7	1044·0	1044·3	1044·7	1045·0	1045·4	1045·7	1046·0
30·9	1046·4	1046·7	1047·1	1047·4	1047·7	1048·1	1048·4	1048·7	1049·1	1049·4
31·0	1049·8	1050·1	1050·4	1050·8	1051·1	1051·5	1051·8	1052·1	1052·5	1052·8
31·1	1053·1	1053·5	1053·8	1054·2	1054·5	1054·8	1055·2	1055·5	1055·9	1056·2
31·2	1056·5	1056·9	1057·2	1057·5	1057·9	1058·2	1058·6	1058·9	1059·2	1059·6
31·3	1059·9	1060·3	1060·6	1060·9	1061·3	1061·6	1062·0	1062·3	1062·6	1063·0
31·4	1063·3	1063·6	1064·0	1064·3	1064·7	1065·0	1065·3	1065·7	1066·0	1066·4

Thousandths of an Inch.

Inch.	·001	·002	·003	·004	·005	·006	·007	·008	·009
Millibars.	·0	·1	·1	·1	·2	·2	·2	·3	·3

For brevity, the fundamental equations may be written :—

$$g_{45} = 980{\cdot}617 \text{ cm./sec}^2.,$$

density of mercury at normal freezing-point of water = 13·5955

1 mercury-inch = 33·8632 millibars, 1 mercury millimetre = 1·33320 millibars.

1000 millibars = 1 bar = 29·5306 mercury-inches = 750·076 mercury **millimetres**, using 1 inch = 2·54000 cm.

TABLE II (A).

Relation between inches and millimetres for comparison of readings of barometers graduated in these units.

In.	Mm.	In.	Mm.	In.	Mm.	In.	Mm.
27·0	685·8	28·0	711·2	29·0	736·6	30·0	762·0
27·2	690·9	28·2	716·3	29·2	741·7	30·2	767·1
27·4	696·0	28·4	721·4	29·4	746·8	30·4	772·2
27·6	701·0	28·6	726·4	29·6	751·8	30·6	777·2
27·8	706·1	28·8	731·5	29·8	756·9	30·8	782·3

NOTE.—(1) The table is based on the *legal* relation 1 in. = 2·5400 cm., which agrees very closely indeed with the best experimental comparisons.

(2) As millimetre barometers have the same standard temperature 0° C. for the brass scale and for the mercury, while inch barometers have a standard 32° F. for the mercury and 60° F. for the brass scale, the readings require correction for temperature by appropriate tables before the comparison can be made.

ARGENTINA.

The Naval Observatory at Darsena Norte, situated on the northern entrance to the Port of Buenos Ayres, sends out, through the radio station located there, five time signals daily (Sundays and holidays excepted), on a wave-length of 800 metres. Their method of transmission consists of the sending of a series of five groups of dashes with a dot at each minute.

The method of transmission is as follows :—

(*a*) from	1.55′.00″ to 1.55′.50″	(Greenwich a.m. mean time) a warning signal consisting of an unbroken series of dashes ;
at	1.56′.00″	a dot representing the 1st time-signal.
(*b*) from	1.56′.15″ to 1.56′.50″	an unbroken series of dashes ;
at	1.57′.00″	a dot representing the 2nd time-signal.
(*c*) from	1.57′.20″ to 1.57′.50″	an unbroken series of dashes ;
at	1.58′.00″	a dot representing the 3rd time-signal.
(*d*) from	1.58′.25″ to 1.58′.50″	an unbroken series of dashes ;
at	1.59′.00″	a dot representing the 4th time-signal.
(*e*) from	1.59′.30″ to 1.59′.50″	an unbroken series of dashes ;
at	2.00′.00″	a dot representing the 5th and last time-signal.

Time-Signals.	Greenwich time.	Cordoba time.
1st	1.56′.00″ ...	9.39′.11$_{78}$″
2nd	1.57′.00″ ...	9.40′.11$_{78}$″
3rd	1.58′.00″ ...	9.41′.11$_{78}$″
4th	1.59′.00″ ...	9.42′.11$_{78}$″
5th	2.00′.00″ ...	9.43′.11$_{78}$″

Duration of dot = ¼ second.

AUSTRALASIA.

The Dominion Meteorological Bureau of Wellington and the shipping companies previous to the war arrived at an agreement with the Commonwealth Meteorological Office at Melbourne for the exchange of news and meteorological information.

Ships are to give information concerning the state of the weather when they are 300 or more miles from the coasts of Australia or New Zealand, or whenever the captain may consider that the atmospheric conditions offer special interest. As far as Australia is concerned all ships which approach or leave Cape Leeuwin will report concerning the atmospheric conditions which prevail.

Until further orders such messages will be accepted on board for transmission without prepayment of charge provided they conform to the following conditions :—

1. That they are written in the special code supplied by the Meteorological Offices.

2. That the messages shall be drawn up by the responsible officer ("observer"), and not by the operator.

3. That the text shall be prefixed by an indication showing whether "Melbourne time" or "Wellington time" is being followed.

4. They shall not deal with other than the following points :—

(*a*) Position of the ship.
(*b*) The barometric reading.
(*c*) The direction and velocity of the wind.
(*d*) The state of the weather.
(*e*) The condition of the sea.

And they shall be written in the prescribed form.

All telegrams as a rule shall be immediately forwarded by the quickest route and shall have priority as a Government message. For these the ship tax will not be collected.

* * * * * * *

Time signals are transmitted by the following stations :—

Adelaide Radio ... ... At noon and midnight, Adelaide standard time (0227-0230 and 1427-1430 G.M.T.), international time-signals being used. Wave-length, 2600.

Melbourne Radio ... ... At noon and midnight (Sundays excepted), Victorian standard time (0157-0200 and 1357-1400 G.M.T.), international time-signals being used. Wave-length 600 m.

Perth Radio ... ... At 11 a.m. and 11 p.m. on 600 metres wave-length, Western Australian Standard Time (0257-0300 and 1457-1500 G.M.T.). Wave-length 600 metres.

Ocean forecasts are transmitted by the following stations at the hours specified (Melbourne time) :—

Perth, 7 p.m. (0900 G.M.T.).
Adelaide, 8 p.m. (1000 G.M.T.).
Brisbane, 11 p.m. (1300 G.M.T.).
Melbourne, 9.30 p.m. (1130 G.M.T.).
Sydney, 8.30 a.m. and p.m. (1030 and 2230 G.M.T.).

Other stations repeat as necessary.

At present an official Ocean Forecast is transmitted daily from the Central Weather Bureau, Melbourne, to all Radio Stations in Australia, also Port Moresby (New Guinea), and it is preceded by a specific statement of sea conditions existing at 9 a.m. around Australia, and sea disturbances off any part of the coast.

Each of the principal radio stations is supplied with a barometer for the purpose of giving information, so that if a shipmaster desires he may obtain the barometer reading, also wind and weather conditions at a radio station, by asking the operator in charge. Daily weather reports (barometer readings, state of wind, weather and sea) are received at the Meteorological Bureau, Melbourne, from shipmasters whenever their vessels are in Australian waters.

NEW ZEALAND.

New Zealand stations send out weather forecasts on 600-metre wave-length, Mondays to Fridays, inclusive, as follows:

Radio Awarua	... ...	8.30 p.m.
Radio Wellington	... ...	9.3 p.m.
Radio Awanui	... ...	10.6 p.m.

The above are New Zealand mean time—11½ hours ahead of G.M.T.

The forecast is not sent out on Saturday or Sunday unless the conditions are exceptional.

General Conditions, Australia and New Zealand.

Any request for information must be addressed to the Coast Station in the form of a Service message signed by the Commander or responsible officer deputed by him. Information regarding weather should not be asked for during hours of darkness, but should be listened for at the regular transmission periods. Providing, however, that there is no jamming, permission is granted for ships to call up shore stations during the daylight hours to obtain weather reports.

BOHEMIA (CZECHO-SLOVAKIA).

Meteorological reports are issued from Prague at 15.45 and 20.30 G.M.T. giving observations for

Prague	Ceske Trebova
Eger	O-Gyalla

BOLIVIA.

In this republic an important meteorological service is carried on as an auxiliary of the telegraphs. Father Tortoso, Director of the Astronomical Observatory of the San Calixto College, collects and collates a number of data covering his district. The Marconi Wireless Telegraph Station in Viacha possesses also an annexe wherein are installed instruments for this purpose. Small meteorological installations also exist in Tarija, Villa Montes, Ulla-Ulla and Copacabana, whilst others are projected in Cuatro Ojos and Puerto Suarez.

BRAZIL.

The Naval Radio Station at Ilha do Governador transmits twice daily a series of time signals, planned in accordance with the International Convention, and transmitted on a wave-length of 1,800 metres. These signals start at 10 hours 55 minutes 0 seconds, and at 20 hours 55 minutes 0 seconds, Rio de Janeiro time (1357-1400 and 2357-2400 G.M.T.), and follow the same procedure as that detailed below under "France, Eiffel Tower." Like the French signals, the Brazilian series is introduced by the letter O (— — —) of the Morse alphabet, and the authorities notify us that these introductory signals, which finish at 10 hours 56 minutes 20 seconds, "are for the special use of the observatory, and, therefore, it may be decided at any time to dispense with them." They also state that in case of "an accident preventing the transmission for correct reception of the signals either at 11 or 21 o'clock, the signals will be repeated in each case half an hour later at 27-30 minutes, instead of 57-60 minutes."

After the time signals issued at 21 o'clock, meteorological and weather signals are issued in accordance with the rules of the Paris Convention of 1912.

The following is the code in which the meteorological reports are issued :—

Station Call Letters, BBBDDFWS.
Example : SL 56702141 FT 567020 XX RF, etc.

The station letters are as follows :—

MN = Manáos	VT = Victoria	FP = Florianopolis
BL = Belem	CF = Cabo Frio	RG = Rio Grande
SL = S. Luiz	RJ = Rio Janeiro	PA = Porto Alegre
FT = Fortaleza	SP = S. Paulo	CB = Corumbà
RF = Recife	ST = Santos	MV = Montevidéo
BH = Bahia	PG = Paranaguá	BA = Buenos Ayres

CANADA AND NEWFOUNDLAND.

A time signal is sent out by the Camperdown Station daily at 2 p.m. (G.M.T.) on a wave-length of 600 metres.

The stations of Alert Bay, B.C., Belle Isle, Camperdown, N.S., Cape Bear, Cape Lazo, Cape Race, Cape Ray, Cape Sable, Clarke City, Dead Tree Point, Digby Island, Estevan, B.C., Fame Point, Father Point, Gonzales Hill, Grindstone Island, Grosse Isle (Quebec), Harrington, Heath Point, Ikeda Head, Kingston (Ontario), Midland (Ontario), Montreal, North Sydney, N.S., Pachena, Partridge Island, Pictou, N.S., Point Amour, Point Edward, Point Grey, Point Riche, Port Arthur (Ontario), Port Burwell, Quebec, Sable Island, Sault Ste. Marie (Ontario), Three Rivers (Quebec), Tobermory (Ontario), Toronto, and Triangle Island receive weather forecasts from the Canadian Meteorological Service at 10 p.m. These advices will be transmitted free to any ship station on request. In addition, the station transmits, without coast charge, radiotelegrams of the following kinds :—

1. Any message concerning the navigation of a vessel sent by the captain of the vessel and intended for any department of the Government, any officer of the Government, or the officer in charge of the coast station.

2. Messages exchanged between the captain of any vessel and any person whatsoever concerning the state of the weather, the condition of the tide or ice, or reports on aids to navigation.

CHILE.

RADIOTELEGRAPH TIME SIGNAL. TRANSMITTED EVERY NIGHT EXCEPTING SATURDAYS AND SUNDAYS AND HOLIDAYS OF THE OFICINA DE HIDROGRAFIA Y NAVEGACION, VALPARAISO.

Important.—The signals will commence punctually at 12 h. 55 m., Greenwich mean time, continuing for exactly five minutes and terminating precisely at 13 h., Greenwich mean time (8 h. 12 m., 13.7 s. to 8 h. 17 m. 13.7 s., local time).

The Oficina de Hidrografía y Navegación transmits daily the radiotelegraph time signal commencing exactly at 12 h. 55 m., Greenwich mean time, and continuing for five minutes. (Length of wave, 1,100 metres.) During this interval each tick or stroke given by the master chronometer of the Oficina is transmitted by the radiotelegraph wave, excepting the twenty-ninth second of every minute, and the last ten seconds of each one of the five minutes. At the exact termination of the five minutes, which will be 1300 Greenwich time, the cipher which indicates the end of the signal is marked by a long contact, as may be seen exactly from the diagram.

If for any reason there should be an error in transmission, the signal "Senal Nula" (Signal nil) will be transmitted, repeated three times at 1301 G.M.T.

RADIOTELEGRAPH WEATHER REPORTS TRANSMITTED DAILY BY THE STATION OF VALPARAISO.

The Radiotelegraph Station of Valparaiso transmits daily and with the same length of wave as that with which the time signal is transmitted—viz., 1,100 metres—the meteorological conditions of certain points on the coast and of the Island of Juan Fernandez.

In order that these signals may be received without difficulty by all vessels, they will be transmitted very slowly.

Except on Sundays and holidays there will be transmitted each day at 12 noon, civil mean time of the meridian 70° 41′ 34″ 5 W. (1643 G.M.T. nearly), the meteorological conditions at 8 a.m., and at 9 p.m. (time of the same meridian), those prevailing at 4 p.m. These reports will be given immediately after the time signals of these times, there being added to the last report a résumé containing the variations undergone by the atmospheric factors of the day.

The stations on the coast will be represented by letters of the alphabet, generally by the first letter of their name, and in the following form:

V =	Valparaiso.	J =	Juan Fernández.	R =	Raper.
T =	Talcahuano.	M =	Mocha.	P =	Punta Arenas.
C =	Corral.	G =	Guafo.		

The signal will be sent commencing with the letters O.M.C. (Meteorological Office of Chile). Next will be given the barometric pressure in millimetres at sea-level, but suppressing the figure representing the hundreds; thus, to indicate a pressure of 753 millimetres, the figure 7 will be suppressed and the number 53 will be transmitted.

Following upon that number 53 will be another numerical figure indicating the direction of the wind. The figures used will be from 1 to 8, as follows: 1 corresponding to N.; 2, NE; 3, E; 4, SE; 5, S; 6, SW; 7, W; 8, NW.

Lastly will follow another figure indicating the force of the wind, according to the scale of Beaufort; but when forces above 8 have to be given, they will be signalled in words: nine, ten, eleven and twelve.

In the event of its not being possible to communicate the meteorological conditions at any of the stations, the word "N" will be placed before the representative sign of the station in question, but if it is only a part of the information that cannot be given, that part will be replaced by the letter "X."

If the weather is not good in the ports indicated by the bulletin, there will be added in current language some of the words, such as storm, mist, rain or sun.

In order that this may be better understood, we give below a specimen bulletin:

O.M.C. V 5534, T 5921, C 5172, M 5765, etc.

which signifies:

Valparaiso,	barometric	pressure	755 mm.,	wind	E,	force	4
Talcahuano	,,	,,	750 mm.	,,	NE	,,	1
Corral	,,	,,	751 mm.	,,	W	,,	2
Mocha	,,	,,	757 mm.	,,	SW	,,	5

CHINA.

The Shanghai-Zikawei station receives the time of the 8th time-belt (120° east of Greenwich) from the Observatory of Zikawei; and transmits it on the wave-length of 850 metres according to the following table:—

from	10.53′	to	10.54′	a.m.	preliminary signals.
from	10.54′	to	10.54′.50″	a.m.	a series of "G."
at	10.55′			a.m.	a dot.
from	10.56′	to	10.56′.50″	a.m.	a series of "O."
at	10.57′			a.m.	a dot.
from	10.58′	to	10.58′.50″	a.m.	a series of "X."
at	10.59′			a.m.	a dot.
from	4.53′	to	4.54′	p.m.	preliminary signals.
from	4.54′	to	4.54′.50″	p.m.	a series of "G," etc.

continuing as in the morning.

These times are 0253-0259 and 0853-0859 G.M.T.

The time-signal, morning and evening, is followed immediately by a meteorological telegram.

During the typhoon season, the station transmits, in addition to these periodical messages, useful information on the state of the weather.

No charge is made for the meteorological information.

The Cape d'Aguilar station sends time of Hong Kong observatory on a wave-length of 1,000 metres at 0356-0400 and 1256-1300 G.M.T.

DENMARK.

Wireless Meteorological Reports.

Transmission station: Lyngby Radio (near Copenhagen).
Continuous waves.
Length of wave: 5,000 metres.
Call signal: OXE.
Normal range: 3,000 km.

Hours of sending		750	Times of observation		700 G.M.T.
,,	,,	1420	,,	,,	1300
,,	,,	1920	,,	,,	1800

Observation Stations and their Call Signals.

		Position.	
		Lat.	Long.
Copenhagen ...	O 1	55° 41′	12° 35′
Skagen	O 2	57° 44′	10° 38′
Hanstholm... ...	O 3	57° 7′	8° 36′
Blaanvandshuk ...	O 4	55° 33′	8° 5′
Hammeren... ...	O 5	55° 17′	14° 46′

Each radio telegram begins with the words: meteo danois.

The 7 o'clock observations will be transmitted for each station in four groups of five figures: BBBDD, FWTTN, BbbRR, MMmms, to be deciphered according to the normal international code.

The 13 o'clock and 18 o'clock observations will be transmitted in three groups for each station, respectively at 14.20 o'clock, BBBDD, FWTTS, Bbb, and at 1920 o'clock, BBBDD, FWTT, Bbb, the letters of which are of the same meaning as those above.

The figure indicating the condition of the sea is omitted in the groups relating to Copenhagen.

Observations which are not reported in one message will be transmitted at the beginning of the next report by adding the hour of the missing observation to the station call signal.

SPECIMEN RADIO TELEGRAMS.

Morning radio :

meteo danois 01 65732 41139 00000 2112 02 66152 34159 30101 20142 03 68732 24119 00001 16102 05 62528 33129 00000 16112.

Following radio at 14.20 *:*

meteo danois 0407 68628 32129 20300 19082 01 64952 2117 306 02 65952 13182 001 03 67280 42153 312 04 68530 20171 000 05 60578 53173 316.

In the above morning radio, the Blaavandshuk (04) morning observation is missing. This morning observation will be found in the 1420 radio after the group 0407 (indicating Blaavandshuk at 7 o'clock).

Besides this, the addition of the call signal of a station at the time of observation will be used to correct a faulty message.

FRANCE (EIFFEL TOWER, PARIS).

Lat. 48° 51′ 41″ N. Long. 2° 18′ 15″ E.

The following arrangements are based on the decisions arrived at by the International Time Conference held in Paris in 1912 modified in accordance with the teachings of experience :—

The radiotelegraphic station of the Eiffel Tower transmits each day signals and telegrams of general interest, which are enumerated below :—

" Ordinary time signals " sent out thrice daily : (1) at 10 a.m.,* (2) between 10.44 a.m. and 10.49 a.m.,† and (3) at 11.44 p.m. to 11.49 p.m. †

" Scientific time signals " at 11.30 p.m. preceding the ordinary night time signals, and a correction group (following the ordinary night signals) at 11.50 p.m.

Since December, 1919, the following transmissions are made regularly from Eiffel Tower, using damped waves :—

G.M.T.	Nature of Signals.	Wave Length
0945–0955	Weather Report	2,500
0956–1000	International Time Signals	2,500
1002–1005	Sidereal Time Signals	2,500
1044–1049	French Time Signals	2,500
1500–1530	Press	3,200
1600–1610	Weather Report	2,500
2329–2333	Astronomical Time Signals	2,500
2335–2340	Weather Report	2,500
2344–2349	French Time Signals	2,500
2349–2351	Series of Code Figures relating to the Astronomical Time Signals	2,500

Press transmission is made at 08.00, 13.00 and 16.30, using continuous waves.

ORDINARY TIME SIGNALS.

According to the original scheme of signals, at 9.55 a.m. three calls (— • — • —) were given, followed by " ordinary time signals," then the signal " wait " (• — • • •).

The " ordinary time signals " commence at 9.56 a.m. and end at 10 a.m. They are transmitted automatically by means of special apparatus situated at the observatory in Paris and managed by the staff of that establishment.

* See Diagram No. 1. † See Diagram No. 2.

The connection between this apparatus and the radio station at Eiffel Tower is established a few instants before the transmission by means of subterranean lines.

The composition of these signals is given by the illustration on the next page.

The complete minutes 9.58, 9.59, 10.0, are therefore indicated by the end of the 3rd lines of the series of three dashes, all confusion being avoided by the fact that the signals preceding these dashes are different for each minute.

The letters O (▬ ▬ ▬) of the first minute and X (▬ • • ▬) of the second minute constitute only advice and tuning signals.

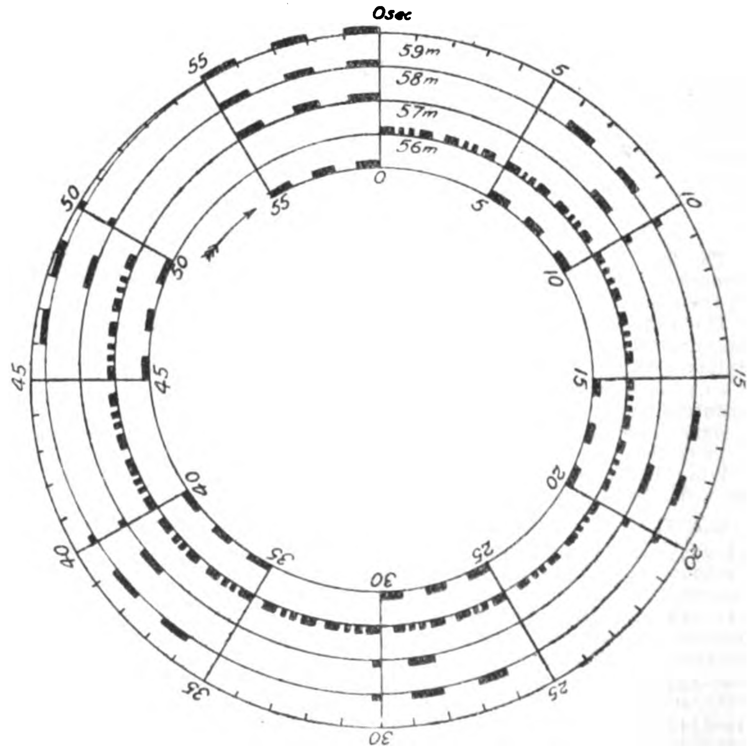


Diagram No. 1, illustrating the 10 a.m., Ordinary Time Signal.

The international service of time signals is shown in the above diagram. The position of the ▬ • • ▬ is quite arbitrary. It varies with the different services and is not the same in the two automatic apparatus employed for the transmission of time signals. This is immaterial because it only affects the preliminary signals for the transmitting apparatus and is not utilised for measuring time.

All the dashes, dots, and spaces of dots or dashes of any one letter in the remainder of the signals are of equal duration : dashes = one second, dots = one-quarter of a second, intervals = one second.

The letters N (▬ •) which characterise the third minute commence at the seconds, 8, 18, 28, 38, 48, and the beginning of the dots of these same letters coincide exactly with the seconds 10, 20, 30, 40, 50.

In the same way the letters G (— — •) characterising the fourth minute commence at the seconds 6, 16, 26, 36, 46, and the beginning of the dots of these same letters coincide exactly with the seconds, 10, 20, 30, 40, 50.

The second set of time signals starts at 10.44 a.m. with a series of "T" (—), followed by one dot at 10.45 a.m. precisely. At 10.46 a.m. the French operator sends a series of "D" (— • •), which is again followed by a dot at 10.47 a.m., whilst at 10.48 a.m. starts a series of "6" (— • • • •), again followed by a dot at 10.49 a.m.

The signals "T," "D," and "6," are sent by hand by an operator at the observatory, only the three dots at 10.45, 10.47, and 10.49, are automatically sent by the special apparatus.

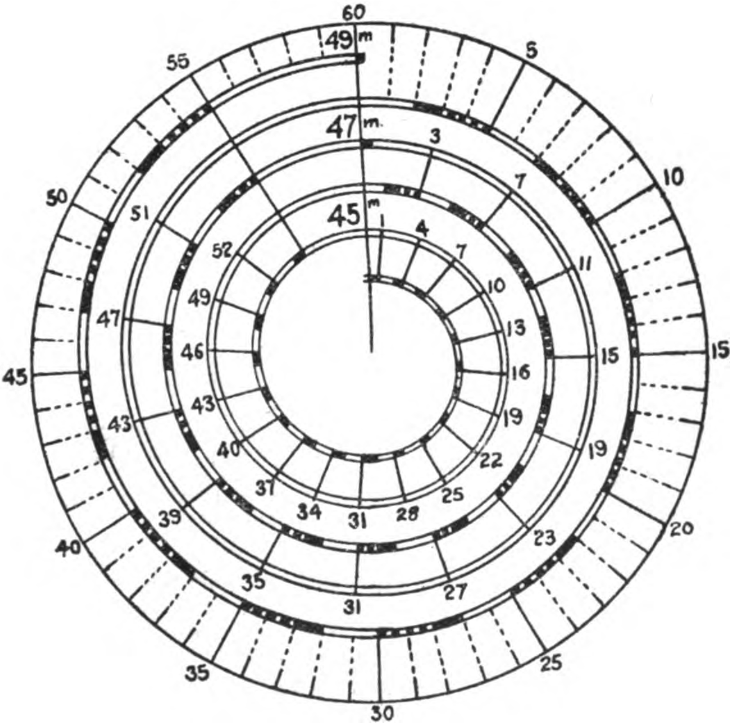


Diagram No. 2, illustrating the 10.49 a.m. and 11.49 p.m. Ordinary Time Signals.

The "ordinary time signals" by night are transmitted in the same way.

The calls are initiated at 11.44 p.m. (or 2344 French time (beginning with a "T" series, followed by a dot at 11.45 p.m., continued by a "D" series at 11.46 p.m., followed by a dot at 11.47 p.m., and completed by a "6" series starting at 11.48 p.m., followed by a dot at 11.49 p.m.

For receiving these hourly signals, termed "ordinary," it is only necessary to have an antenna, of dimensions and height varying according to the distance from Paris, connected with a radiotelegraphic receiver, and to listen to the signals, with the clock or watch to be compared in front of the observer. It is easy for an unskilled person to start by estimating the difference up to

half a second between the hours indicated by the clock and those which correspond with the signals that are heard in the telephones of the receiver. After some practice it is quite easy to estimate one-quarter of a second. In order to reach an accuracy of one-tenth of a second it is generally necessary to have recourse to simultaneously recording on the same photographic strip the radiotelegraphic signals and the beats of the clock to be compared. Excellent results have in this way been obtained by various physicists and engineers.

It frequently occurs, especially in winter, that the Paris observatory is not able to make astronomical observations each night. It is therefore necessary to be satisfied with the times registered by the chronometers of which the rate is known for the setting of the clock which sends the signals. These chronometers being sufficiently numerous and accurate, such a procedure causes no inconvenience so long as the cessation of astronomical observations does not exceed a few days. If, on the other hand, the period of cloudy weather continues too long, it is no longer possible to answer for the accuracy of the chronometers. Wireless telegraphy in such cases furnishes a method which allows of the co-operation of other observatories, better situated as regards climatic conditions, in the determination of the state of the master-clock at Paris, and in consequence in the accurate setting of the clock which sends the signals.

Scientific Time Signals.

Every night at 11.29 p.m. (2329 French time) three calls (— • — • —) are made.

Starting at 11.30 p.m. (2330 French time) a series of 300 dots each formed of a single spark are transmitted, the 60th, 120th, 180th and 240th being suppressed in order to establish the indication for counting purposes.

This series is heard at the observatory in Paris in a wireless receiver and compared with the tickings of a time-keeping clock by the coincidence method. A simple calculation permits of deducing the times (as marked by the clock) from the coincidences of the 1st and 300th dots of the series, which are exact to 1 or 2 hundredths of a second. These may be transformed into "legal time hours" by adding the corresponding correction of the clock.

These latter hours are transmitted by the Eiffel Tower soon after the end of the "ordinary time signals" at night, in the following manner :—

If the times of the 1st and 300th beats are, for instance, 11 hours 30 minutes 8.15 seconds p.m. and 11 hours 35 minutes 1.17 seconds p.m., the two following groups of figures will be twice repeated :—

— • • • — 300815. 350117 — • • • — 300815. 350117
— • • • — 300815. 350117.

In order to know approximately the correction to be made to a clock (or a chronometer) with reference to the legal international time of the observatory, it is sufficient to listen to the ticking of that instrument by means of a microphone suitably attached to a radiotelegraphic receiver at the same time as the series of 300 points are transmitted by the Eiffel Tower. It is necessary to observe and note the coincidences, and then the hours of the clock (or the chronometer) should be calculated at the moment of the 1st and 300th dots.

By subtracting these times respectively from those sent out by the Eiffel Tower, it is possible to obtain two correcting values for applying to the readings of the clock for measuring time which should be correct to about two hundredths (·02) of a second.

METEOROLOGICAL REPORTS FROM EIFFEL TOWER.

The meteorological messages from the Eiffel Tower contain observations from 16 French stations and from Brussels and Mayence, and are issued at the following hours (Greenwich time) :—

9 h. 45m.	Observations at	7h.
16h.	,,	13h.
22h. 30m.	,,	18h.

Wave-length, 2,500 metres.

The information is sent in the following order :—

(1) *Observations at 7 a.m.*

Four groups of five figures for each station.

BBBDD FWTTC βbbRR MMmms

The symbols have their usual significance, but barometric values are expressed in millimetres and tenths and

C = Direction of upper cloud (cirrus and cirrostratus) 0–9 (International Code).
RR = Rain, in millimetres, for previous 24 hours.
MM = Maximum temperature 7 a.m. to 7 a.m.
mm = Minimum Temperature.
S = State of sea, 0–9. (This figure is omitted when the station is inland—only four figures being sent).

Upper Winds.

Two groups of 6 letters for each station :—

$D_1 V_1 D_2 V_2 D_3 V_3$ $D_4 V_4 D_5 V_5 D_6 V_6$

$D_1 D_2 D_3 D_4 D_5 D_6$ Indicates the direction of the wind at the different altitudes.

$V_1 V_2 V_3 V_4 V_5 V_6$ Indicates the force of wind at different altitudes.

D_1 und V_1	at	500 metres.
D_2 and V_2	,,	1,000 ,,
D_3 and V_3	,,	1,500 ,,
D_4 and V_4	,,	2,000 ,,
D_5 and V_5	,,	3,000 ,,
D_6 and V_6	,,	4,000 ,,

The value of the letters employed are shown below.

(2) OBSERVATIONS AT 13 AND 18 HOURS.

One group of five figures, one group of four figures and one group of three figures for each station.

B B B D D F W T T β b b

Upper Winds.

Two groups of six letters for each station.

$D_1 V_1 D_2 D_3 V_3$ $D_4 V_4 D_5 V_5 D_6 V_6$

The telegrams commence by the words :—

Météo France.

The groups of figures and the groups of letters for each station are preceded by a group of two figures indicating the station.

Missing stations are shown by five x's—x x x x x preceded by the number of the station.

Groups of figures are given for the following stations :—

01	Ile d'Aix.	11	St. Mathieu.
02	Biarritz.	12	Marseilles.
04	Brussels.	13	Mayence.
05	Cherbourg.	15	Paris.
06	Clermont.	16	Perpignan.
07	Dijon.	18	Rennes.
08	Gris Nez.	19	Strasbourg.
09	Limoges.		

Groups of letters are sent for the following stations :—

03	Bordeaux.	15	Paris.
04	Brussels.	17	St. Pierre Quiberon.
14	Montpellier.	19	Strasbourg.

For upper winds the following code is used :—

Direction of Wind.

NNE	a	SSW	i
NE	b	SW	j
ENE	c	WSW	k
E	d	W	l
ESE	e	WNW	m
SE	f	NW	n
SSE	g	NNW	o
S	h	N	p

Speed of Wind.

Metres per second—

0	a	26	n
2	b	28	o
4	c	30	p
6	d	32	q
8	e	34	r
10	f	36	s
12	g	38	t
14	h	40	u
16	i	42	v
18	j	44	w
20	k	46	y
22	l	48	z
24	m		

Letter x denotes missing observations.

The following is the message issued at 09·45 on January 30th, 1920. The names of the stations have been inserted next to the Index numbers.

	BBBDD	FWTTC	βbbRR	MMNN Sea
Ile D'Aix 01	64170	65099	71005	1008
Biarritz 02	69816	34109	50304	11065
Brussels 04	xxxxx			
Cherbourg 05	56224	11079	22220	1106
Clermont 06	69366	14009	10400	0953
Dijon 07	68468	20803	30400	0700
Gris Nez 08	53870	74085	71316	07046
Limoges 09	66068	25059	702xx	0904
St. Mathieu 11	59628	53109	22202	11096
Marseilles 12	67930	10039	21006	1203
Mayence 13	xxxxx			
Paris 15	60868	55069	31703	0904
Perpignan 16	70000	00020	40200	1101
Rennes 18	58322	34129	10209	1201
Strasbourg 19	68070	11019	60497	1001
Bordeaux 03	Pluie			
Brussels 04	xxxxx			
Montpellier 14	xxxxx			
Paris 15	Pluie			
St. Pierre Quiberon 17	Plafond trop bas			
Strasbourg 19	xxxxx			

Other meteorological reports are issued from Naval stations on a wave-length of 1,350 metres in the code BBBDD FWTTC βbbRR MMmmS for observations at 0700, and BBBDD FWTTC βbb for observations at 1300, 1800.

(*a*) From Mourillon, near Toulon, at 0900 (observation at 0700), and 1900 (observations at 1800) for: (1) Cap Bearn, (2) Cette, (3) Aubagne, (4) Toulon, (5) St. Raphael, (6) Ajaccio.

Reports begin with the words Meteo-Mourillon. Upper air observations are added in the code DDYY (DD=direction, YY=velocity in m/s) for heights of 200, 500, 1,000 and 2,000 metres.

(*b*) From Sidi Abdallah reports begin with words Meteo-Sidi-Abdallah, and are issued at 0945 (observations at 0700), 1930 (observations at 1800), for: (1) Djebel Krichtel, (2) Baraki, (3) Cape Garde, (4) Sidi Ahmed, (5) Sfax.

Reports beginning Meteo-Alger are issued at 1345 (observations at 0700) for: (1) Rabat, (2) Memours, (3) Tenes, (4) Algiers, (5) Cape Garde, (6) Bizute, (7) Sfax, (8) Marseilles, (9) Colomb Béchar, (10) Laghouat, (11) Toughourt.

FRENCH OCEANIA.

The Papeete station (Tahiti Is.) transmits every day, including holidays, on the wave-length of 600 metres, two meteorological reports, one at 11 a.m. and the other at 11 p.m. (Greenwich mean time), which are made up as follows:—

I.

The reports contain the date of the report of the meteorological station of Point Venus, followed by a group of 8 figures in normal code: BBBDDFWS.

The report is preceded by the following signal: "Tahiti observatoire."

II.

Notice to navigators concerning alterations of lightship or lightbuoys, the presence of derelicts, and the disappearance of lightbuoys or important buoys, and any other information in regard to navigation, will be added, as occasion arises, in the report. It will be sent out in French and English.

III.

The reports will be transmitted three times in succession; the first time transmission will be made rapidly, the second and third times slowly.

IV.

A safety signal will be transmitted to ships at any hour of the day or night, repeated at short intervals ten times on full power: Tahiti T.T.T., followed by advice of cyclones, typhoons or derelicts, or any sudden changes in the position or form of fixed obstructions or of land marks. The message will be repeated three times with intervals of ten minutes.

GERMANY.

The transmission of time signals is no longer performed by Norddeich but by Nauen at the hours which were formerly in force—1157-1200 G.M.T. and 2357-2400 G.M.T. Central European Time—but on a 3,900 metre wave, and in accordance with the Onogo arrangement agreed upon at the International Time Conference, Paris. After the time signal, weather reports are no longer issued; but Nauen transmits at 10 a.m. and 8.30 p.m. Central European Time (0900 and 1930 G.M.T.), international weather reports.* The circulation of storm warnings is likewise no longer performed; but in certain cases, however, Nauen transmits "Important news for Mariners," which are repeated several times after the transmission of the time signal.

* Observations are given for Breslau, Keitum, Berlin, Vienna, Hamburg, Memel, Aachen Swinemunde, Borkum, Neufahrwusser, Hanover, Dresden, Munich, Karlsruhe, Frankfurt.

GREAT BRITAIN.*

Forecasts are issued daily by wireless as follows :—

Time of Issue.	Period of Forecasts.	Area.	Station and Wave-length.
0100	Following 24 hours.	North Sea 56° N. to 60° N.	Cleethorpes 3,000 m.
0500	Following 12 hours.	North Sea.	Cleethorpes. 3,000 m.
0700	Following 12 hours.	West and South-West Coasts.	Poldhu. 2,700 m.
1030	Following 24 hours.	Sea. 60° N. to 64° N.	Cleethorpes. 3,000 m.
1700	Following 12 hours.	North Sea.	Cleethorpes. '3,000 m.
2130	Following 12 hours.	West and South-West Coasts.	Poldhu. 2,700 m.

Weather reports are also issued as follows :—

Time.	Station.	Wave-length.	Nature of Report.
0230	Carnarvon†	14,000	Data message NNN BBBDD FWβbb.
0315	Air Ministry	1,400	Data message NNN BBBDD FWβbb.
0915	Air Ministry	1,400	Data message NNN BBBDD FWβbb.
1430	Carnarvon†	14,000	Data message NNN BBBDD FWβbb.
2015	Air Ministry	1,400	Data message NNN BBBDD FWβbb.

In the code the letters have the usual meaning, but NNN is the index number of the station to which the reports refer.

These numbers are as follows :—

101 Lerwick.
110 Aberdeen.
118 Tynemouth.
125 Howden, Yorkshire.
136 Yarmouth.
150 Dungeness.
162 Portland Bill.
166 Scilly.
169 Pembroke.
174 Holyhead.
182 Malin Head.
184 Dublin.
192 Valencia.
195 Stornoway.
197 Castlebay.
199 Blacksod Point.

In addition to these reports, hourly reports are issued from 08·00 to 15·00 from the Air Ministry (call sign GFA), wave-length 1,400 m., giving the actual weather half-an-hour before the time of issue at a number of places in South-East England. Similar reports are issued at intervals from Le Bourget, near Paris, giving weather in N.E. France.

HAWAII.

Weather bulletins obtained from the United States Weather Bureau at Honolulu are broadcasted daily by the Pearl Harbour Radio Station (NPM) at 8 a.m., noon, 4 p.m., and 8 .pm., and after time signal.

Time Signal.—U.S. Naval Radio Station, Pearl Harbour, T.H., transmits time signals daily on 600-meter damped, and 11,200-meter undamped, waves at noon, 180th meridian time, i.e., at 2355-2400 G.M.T., accurate to within 0·2 second with San Francisco Naval Observatory time.

HOLLAND.

Since July 1st, 1915, the station of Scheveningen Harbour has been sending at 11.15 a.m. and p.m. (Greenwich time) on a wave-length of 1,800 metres a meteorological radiotelegram in Dutch and English, followed by a

* We understand, as we go to press, that the whole question of Time and Weather Signals is under consideration and that new arrangements may be announced shortly.

† To be replaced shortly by some other high-power transmitting station.

storm signal whenever necessary, and also a notice to mariners in Dutch and English.

The meteorological radiotelegram is preceded by the letters KNMI, and consists of four sets of two groups of five figures each for the stations Helder, Flushing, Gris Nez, and the Hague ; and, further, of four sets of two groups wherein one group has five and the other group four figures each for the stations Yarmouth, Shields, Skudnaes, and Sylt, according to the scheme.

BBBDD FWTT(S).

Following the above comes, if deemed important, first, the storm signal—*e.g.*, warning signal, signal of shifting south-east storm ; second, the notice to mariners, preceded by the letters NBAZ—*e.g.*, wreck, mouth Hook of Holland.

Examples of meteorological radiotelegrams from the first and the fifth of the eight sets of two groups KMNI are 69010-21541 and 57316-4405 ; their translations follow :

HELDER.	YARMOUTH.
Barometer, 769·0 mm.	Barometer, 757·3 mm.
Wind direction, E.S.E.	Wind direction, south.
Wind force, very light.	Wind force, moderate.
Sky, slightly cloudy.	Sky, overcast.
Temperature, 4 C.	Temperature, 5° C.
Sea, very smooth.	

INDIA.

A time signal based on the International system is sent out from the Calcutta Radio Station twice daily, at 0727-0730 and 1927-1930 Greenwich mean time. The wave-length used is 2,000 metres and the power 30 k.w. The signal is controlled by the staff of the Alipur Observatory at Calcutta.

Should the time signal be inaccurate for any reason, it will be followed by the erase signal of nine or more dots and the words " signal failed."

With regard to meteorological signals and weather reports, the following extract from the departmental instructions for radiotelegraph stations sets forth the arrangements in current use.

The meteorological department will supply each day (starting from July 1st, 1918) to the radio offices concerned a message to be signalled broadcast at the following times and on the specified wave-length :

From	Time G.M.T.*	Wave-length metres.
Karachi ...	0730 and 1910	2,000
Calcutta ...		2,000
Rangoon ...		1,000
Bombay ...	0740 and 1920.	2,000
Madras ...		2,000
Port Blair ...		1,000

When the weather is undisturbed the night message will be a repetition of the day message, while during disturbed weather the night message may or may not be the same. When the meteorological department forwards the text of the broadcast message to the radio offices the message itself will be preceded by a code word informing the radio office at what time the

* Indian Standard Time is 5½ hours ahead of G.M.T.

message is to be signalled. These code words are for the information of the wireless station concerned only and should not be repeated to shipping.

Code word.		Meaning.
Pyramid	...	Following message to be signalled broadcast to ships at 13 hours (or 13 hours 10 minutes).
Triangle	...	Following message to be signalled broadcast to ships at 1 hour (or 1 hour 10 minutes).
Circle	...	Following message to be signalled broadcast to ships at 13 hours (or 13 hours 10 minutes), and again at 1 hour (or 1 hour 10 minutes).

The following are examples:

Example I.

From Calcutta ... To { V W C. / V T R. / V W M. / V T P. }

Text.

Pyramid. Moderate storm centre sixteen north ninety east moving northwest.

This means that the radio offices at Calcutta and Rangoon will signal broadcast at 13 hours the message "Moderate storm centre sixteen north ninety east moving northwest," while the offices at Madras and Port Blair will signal the same message at 13 hours 10 minutes.

Example II.

From Simla ... To { V W K. / V W B. }

Text.

Circle Normal.

In this case Karachi will signal at 13 hours the single word "Normal," and repeat it at 1 hour, while Bombay will signal the same word at 13 hours 10 minutes and again at 1 hour 10 minutes.

Stations must cease all work, except dealing with "distress" messages five minutes before these weather messages have to be transmitted so as to be ready to send on the proper wave-length punctually at the hours mentioned. They should signal the "all station" call five times before actually sending the message so as to give ship stations an opportunity of obtaining the correct adjustment of their instruments.

Weather Information by Wireless Telegraphy for the use of Ships.

Information regarding weather will be distributed twice daily by wireless telegraphy from the existing coast wireless stations at the times and on the wave-lengths specified in the preceding table printed for the meteorological section.

The sending station will signal the "All Station" call five times before sending the message, in order to give ship stations an opportunity of obtaining the correct adjustment of their instruments.

No weather telegram for the Bay of Bengal is ordinarily published between January 14th and April 1st.

ITALY.

AEROLOGICAL AND METEOROLOGICAL SERVICE.

I. At present the service is carried out by three groups of stations, the central station of the first group being at Rome, that of the second group at Florence, and that of the third at Naples.

II. Transmissions are made twice a day at the hours given in the table below, in which the length of wave used is also given :—

Groups.	Stations.	Times.		Wave-lengths.
I. Central Station, Rome	Genoa*	0730 to 0735	1330 to 1335	600 s.
	Leghorn	0735 „ 0740	1335 „ 1340	1,200
	Ancona	0755 „ 0800	1355 „ 1400	1,200
II. Central Station, Florence	Padua	0740 „ 0745	1340 „ 1345	900
	Turin	0745 „ 0750	1345 „ 1350	900
	Milan	0750 „ 0755	1350 „ 1355	900
III. Central Station, Naples	Vittoria*	0725 „ 0730	1325 „ 1330	600
	Maddalena	0730 „ 0735	1330 „ 1335	600
	Messina	0735 „ 0740	1335 „ 1340	600
	Brindisi	0740 „ 0745	1340 „ 1345	2,500 arc.

III. The Florence and Naples stations transmit a summary of the reports received to Rome (ICD) at the following times, and with the following wave-lengths :—

Stations.	Times.		Wave-length.
Naples	0800 to 0810	1400 to 1410	3,200 arc.
Florence	0810 „ 0820	1410 „ 1420	900 s.

IV. The complete reports are then transmitted from Rome (IDO) at 09.30 and 14.45, with wave-length 11,000 c. At 03.45 Rome (IDO) transmits a local weather report to Paris.

V. The aerological stations are identified by the groups of two figures given next to each station :

04 Padua
06 Genoa
07 Florence
08 Leghorn
09 Ancona
12 Maddalena
13 Naples
14 Brindisi
16 Messina
18 Vittoria

VI. Other aerological stations will be added to those mentioned above and will commence operations as soon as ready. The complete list with corresponding numbers is as follows :—

01 Turin
02 Milan
03 Trent
04 Padua
05 Trieste
06 Genoa
07 Florence
08 Leghorn
09 Ancona
10 Chieti
11 Rome
12 Maddalena
13 Naples
14 Brindisi
15 Cagliari
16 Messina
17 Palermo
18 Vittoria
19 Taranto

* Genoa passes the reports to Leghorn and Vittoria to Messina for transmission to Centocelle.

VII. The reports will be drawn up in the following form :—

$BBB\beta HW/LAdSVD/V_1D_1V_2D_2V_3D_3/V_4D_4V_5D_5V_6D_6$

Where BBB and β and S have the usual meaning, but—

H = the relative humidity from 0 to 100 (Table II.).

W = the weather at the time of observation (Table III.).

L = the amount of cloud (0 = nil, 10 = overcast).

A = Type of cloud to which the greatest importance is attached (Table V.).

d = direction in which clouds are moving according to the eight fundamental directions (Table VI.).

V = Velocity of the wind at ground level in m/s (Table VIII.).

D = Direction of the wind (Table VI.).

$V_1D_1V_2D_2$, etc., denote the velocity of the wind in m/s and the respective directions at 500 m., 1,000 m., 1,500 m., 2,000 m., 3,000 m., and 4,000 m. above sea-level.

TABLE II. (H).

0	from 0 to	10
1	,, 10 ,,	20
2	,, 20 ,,	30
3	,, 30 ,,	40
4	,, 40 ,,	50
5	,, 50 ,,	60
6	,, 60 ,,	70
7	,, 70 ,,	80
8	,, 80 ,,	90
9	,, 90 ,,	100

TABLE III. (W).

0 Clear horizon.
1 Slight haze.
2 Heavy haze.
3 Drizzle.
4 Rain.
5 Snow.
6 Slight fog.
7 Dense fog.
8 Storm.
9 Storm in sight.

TABLE V. (A).

1 Stratus (st).
2 Nimbus (nb).
3 Strato cumulus (st-cu).
4 Cumulus (cu).
5 Cumulo nimbus (cu-nb).
6 Alto stratus (a-st)
7 Alto cumulus (a-cu).
8 Cirro cumulus (ci-cu).
9 Cirrus (ci).

TABLE VI. (d.D).

0 No direction.
1 from N.
2 ,, N.E.
3 ,, E.
4 ,, S.E.
5 ,, S.
6 ,, S.W.
7 ,, W.
8 ,, N.W.

TABLE VIII. (V).

0	from 0 to	1
1	,, 1 ,,	3
2	,, 3 ,,	5
3	,, 5 ,,	7
4	,, 7 ,,	9
5	,, 9 ,,	11
6	,, 11 ,,	13
7	,, 13 ,,	15
8	,, 15 ,,	17
9	above 17.	

NOTES.—Should any data be missing from a group, an equal number of x's are inserted in its place. Should soundings not be taken, the wireless telegraph message concerning one station will consist of only two groups (meteorological) ; and when the sounding does not reach 2,000 m. the wireless telegraph message will consist of three groups (two meteorological and one aerological).

The "Saseno" IDB wireless telegraph station transmits aerological and meteorological reports at 0700 and 1700 to the ship at Brindisi IDV, with a 600 s. wave.

The wireless telegraph station at Centocelle (Rome) and St. Elmo (Naples) also carry out the following special service for the exchange of reports on local weather conditions, and on the departure and arrival of aircraft for the Rome to Naples and Naples to Rome service.

St. Elmo W/T station, wave 3,200 c.	0700 to 0745	Exchange of meteorological information and reports of movements of aircraft.
Centocelle " " 3,850 c.		
St. Elmo " .. at	0915 1100	Bulletin.
Centocelle " .. "	1515	Bulletin.

JAPAN.

Transmission of Meteorological Reports by Wireless Telegraphy.

(Notification of the Department of Communications No. 836, December 11th, 1914.)

Relating to the transmission of storm warnings at the Wireless Stations at Choshi Radio, Fukkikaku, and Dairenwan.

The storm warnings issued by the Central Meteorological Observatory at Tokyo are transmitted free of charge to vessels at sea from the wireless telegraph stations at Choshi, Fukkikaku and Dairenwan, according to the following method (it always being understood that this shall not apply in the case of special transmissions made at the request of vessels):

The storm warnings will be issued in the English language, and will comprise the items referred to in (*a*) and (*b*) below:

(*a*) Text of warning, date, time; position, rate and direction of movement of centre of atmospheric depression or typhoon.

(*b*) Maritime instructions and notices. When storm warnings are received at the coastal stations, they will be immediately transmitted, and will be repeated from the Choshi station at 9.5 p.m., from the Fukkikaku station at 8.30 p.m., and from the Dairenwan station at 9 p.m.

Wave-lengths of 600 metres are employed, and the storm warnings are continued three times after the signal "Q S T" has been thrice repeated.

Notification of the Department of Communications No. 1,105.

From December 11th, 1916, the following procedure for announcing central standard time at 1200–1204 G.M.T. by wireless telegraphy was adopted at the Choshi and Funabashi wireless telegraph stations:

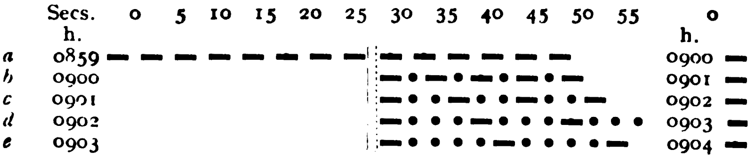
Procedure for Time Signaling by Wireless Telegraphy.

1. Every evening, with the exception of Sundays, time signals are automatically made by the transmitting apparatus at the Choshi and Funabashi wireless telegraph stations, as communicated by the Tokyo Observatory through the connected telegraph wires on land. The wavelength of 600 metres is used in the case of the Choshi station and that of 4,000 metres in the case of the Funabashi station.

The time to be signalled in accordance with the above is indicated five times—viz., at 9.0 p.m. (Central Japan Standard Time), 9.01 9.02, 9.03, and 9.04 (1200–1204 G.M.T.) by means of dashes continuing for one second from the times mentioned, and following the various warning signals distinguished as below:—

(*a*) The first warning signal, consisting of dashes, will commence at 8.59 p.m., and continue till 8.59.55, after which a suspension of five seconds will be followed by a dash, continuing for one second.

(See table below) :—



(*b*) The second warning signal, consisting of a long dash and a dot, will commence at 9.00.30 and continue till 9.00.55, after which a suspension of five seconds will be followed by a dash continuing for one second.

(*c*) The third warning signal, consisting of a dash and two dots, will commence at 0901.30 and continue till 0901.55, after which a suspension of five seconds will be followed by a dash, continuing for one second.

(*d*) The fourth warning signal, consisting of a dash and three dots, will commence at 0902.30, and continue till 0902.55, after which a suspension of five seconds will be followed by a dash, continuing for one second.

(*e*) The fifth warning signal, consisting of a dash and four dots, will commence at 0903.30, and continue till 0903.55, after which a suspension of five seconds will be followed by a dash, continuing for one second.

MAURITIUS.

Time Signals are radiated daily by the Mauritius Wireless Station at 9 a.m. and p.m. G.M.T. to 9.1 a.m. and p.m. on a wave length of 2,000 metres.

MEXICO.

The coast station of Campeche, Guaymas, Mazatlan de Sinaloa, Payo Obispo and Vera Cruz transmits the time of the meridian of Tacubaya (6 h. 36m. 46.67 secs. behind Greenwich) daily at noon in the following manner :—

> From 11.55 a.m. to noon : repeated transmission of the inquiry signal "CQ"; then repeated transmissions of the signal "XH" (time of Tacubaya) ;
>
> At noon : transmissions of the word "noon," always followed by a free announcement of the state of the weather.

PANAMA.

(See United States.)

PHILIPPINE ISLANDS.

Time Signals are transmitted from Manila to every Telegraph Station all over the country by Land Lines every day at 11.00 a.m. (0300 G.M.T.). The clock of the Central Observatory, which is connected with the Bureau of Posts telegraph office at Manila by a land line, is connected to the telegraph circuit at 10.55 a.m. Time signals are then sounded. In the last half minute before 11.00 a.m. the operator at the central office dots with the key during 20 seconds to indicate that it is the half half minute. Ten seconds are omitted in order to give a chance to adjust instruments to receive the final corrected time. Then, at the expiration of the 10 seconds, a long heavy dash is given, thus completing the time and correcting the clocks in all offices.

The wireless stations at Malabang and Cuyo radiate broadcast Manila time, transmitted to them from Manila by landlines, every day at 11 a.m. (0255–0300 G.M.T.). The radio station of the Navy Department at Cavite

also broadcasts time signals at 11.00 a.m. and 10.00 p.m. daily. (0255–0300 and 1355-1400 G.M.T.). This station is connected with Manila by cable.

Weather reports are exchanged regularly between the observatory at Manila and that of Guam *via* the Naval radio station at Cavite. Weather warnings are also sent to Hanoi, French Indo-China, *via* Cavite.

POLAND.

The Warsaw Central Station transmits press and meteorological reports at 10 a.m., 5.30 p.m., and at midnight (0800, 1530, 2200 G.M.T.). (Call signal WAR, Wave length, 2,000 m.). The code used for the meteorological reports is as follows :—

NN BBBDD FWTT where NN stands for the station number

and the observations are sent for 01 Posen, 02 Warsaw, 06 Cracow, 04 Lodz, 08 Lemberg, 07 Tarnow.

PORTUGUESE EAST AFRICA.

Time Signals are sent out twice daily from Lourenço Marques at 7.57 to 8 a.m., and 6.57 to 7 p.m. G.M.T., on a wave length of 600 metres following the system of the Eiffel Tower Ordinary 10 a.m. Time Signal, *q.v.*

Following every time signal, a local weather report is transmitted in English as follows :

CRZ Weather Report—at 8 a.m. G.M.T. (or 7 p.m. G.M.T.). Pressure at sea-level 760.5 millimetres, wind E.N.E., strong sea, rough. Campos Rodrigues Observatory, Lourenço Marques.

SOUTH AFRICA.

The radiotelegraphic stations at Capetown (Slangkop) and Durban signal at 1.15 o'clock in the afternoon of each day (1115 G.M.T.) weather reports containing information relative to the meteorological conditions affecting the coastal belt of the South African Union.

The arrangements made in the Union of South Africa for the transmission of radio time signals for the use of shipping in South African waters is as follows :—

A special clock at the Royal Observatory, Capetown is adapted to give automatically a series of signals of a distinctive character extending over an interval of half a minute. The clock is brought into conformity daily with the observatory standards shortly before the hour selected for transmitting the signals. The hour chosen is 11 p.m., Union standard time (9 p.m. G.M.T.).

The time signal is preceded by the usual warning signal from the radio coast station. The time signal proper consists of twelve dashes, each of about ¾ of a second in duration, in five groups, commencing at the following Greenwich mean times :—

Group I.			*Group II.*			*Group III.*			*Group IV.*			*Group V.*		
h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.	h.	m.	s.
8	59	30	8	59	38	8	59	44	8	59	48	8	59	54
—	—	32	—	—	40	—	—	—	—	—	50	—	—	56
—	—	34												58
												9	0	0

The beginning of the last dash corresponding exactly with 9 p.m. Greenwich or 11 p.m. South African standard time.

By means of a special relay, the time signal is simultaneously transmitted to Slangkop (Capetown) and Durban radio stations, the signal to the latter station passing over the land telegraph wire connecting Capetown and Durban, a distance of about 1,100 miles.

SPAIN.

The military radiotelegraph stations of Carabanchel will transmit from March 1st, 1920, three radiotelegrams at the hours of 1000, 1530 and 2030 (G.M.T.) respectively.

Wave-length, 2,000 metres.
Power, maximum.

All the radiotelegrams will commence with the initials of the Carabanchel wireless station, EGC, followed by SME, the initials of the words, "Servicio Meteorológico Espanol."

RADIOTELEGRAM AT 10 H.

This will contain the results of the meteorological observations at the stations given below, preceding the groups of signs corresponding to each one of the initials of the name of such station as indicated hereunder :—

1, MD, Madrid ; 2, LC, La Coruña ; 3, SF, San Fernando ; 4, BA, Barcelona ; 5, SA, Santander ; 6, VD, Valladolid ; 7, ZA, Zaragoza ; 8, MA, Mahón ; 9, BD, Badajoz ; 10, CD, Córdoba ; 11, AI, Alicante ; 12, AL, Almeria ; 13, ME, Melilla ; 14, TE, Tetuán ; 15, IZ, Izaña (Teneriffe). The observations of the stations 1-3 inclusive will be made at 7 h. The others will be at 8 h. (G.M.T.).

For each station the results of the observation made close to the ground are expressed by means of the four groups recommended by the Paris Conference* (October, 1919) :—

1. BBBDD. 2. FwwTT. 3. βbbw 'w.' 4. { NNN'N'S (coast station). / NNN'N' V(interior station).

See the instructions for the telegraph service published by the Central Meteorological Observatory.

If the station makes soundings, the four groups mentioned above are followed by the five :—

1. DDFF. 2. DDFF. 3. DDFF. 4. DDFF. 5. DDFF.

The first group indicates the direction and velocity of the wind in metres per second according to the atmospheric conditions 250 metres above the meteorological station, the second group at 500, the third at 1,000, the fourth at 2,000, and the fifth at 3,000.

See the instructions above mentioned.

RADIOTELEGRAM AT 1530 H.

This will contain the observations made at 13 h. (G.M.T.) at the same stations mentioned for the previous radiotelegram, and drawn up in the same manner.

Next appears a group of nine signs which express the state of the sea on our coasts, in conformity with the following rule : the first sign from the left indicates the state of the sea on that part of the coast comprised between San Sebastián and Santander ; the second between Santander and Cape Estaca de Vares ; the third between Cape Estaca de Vares and the Portuguese frontier ; the fourth between Huelva and Gibraltar ; the fifth between Gibraltar and Almería ; the sixth between Almería and Valencia ; the seventh between Valencia and the French frontier ; the eight in the Balearic Isles ; and the ninth in Argelia.

This is followed by a group of eleven signs, indicating the probable weather for the following twenty-four hours : the first sign from the left indicates the probable weather in the regions of Galicia, Asturias and León, giving preference to that concerning the coast ; the second corresponds to the provinces of Santander, Vizcaya and Guipúzcoa, likewise giving preference to the phenomena most interesting to navigators ; the third the weather which

* ww = present weather ; w'w' = past weather.
NN = form and direction of motion of low cloud.
N'N' = form and direction of motion of high cloud.

will be experienced in the central part of Spain, the provinces of Burgos, Palencia, Navarra, Logroño, Valladolid, Soria, Zaragoza, Zamora, Segovia, Guadalajara, Salamanca, Avila, Madrid, Teruel, Cáceres, Toledo, Cuenca, Badajoz, Ciudad Real, and Albacete, giving preference to the kinds of weather interesting to agriculturists; the fourth the probable weather in the north-eastern part of Spain, provinces of Huesca, Lérida, Gerona, Barcelona and Tarragona, in its part which most interests farmers and navigators; the fifth the weather in Levante: provinces of Castellón, Valencia, Alicante, and Murcia, in the part which interests farmers and navigators; the sixth the weather in Andalusia: provinces of Córdoba, Sevilla, Huelva, Cádiz, Málaga, Jaén, Granada and Almería, giving preference to the weather interesting agriculturists; the seventh the weather in the Straits of Gibraltar and north part of Morocco, giving preference to weather interesting navigation; the eighth the weather in the Balearic Isles and in the adjacent zone in the Mediterranean, giving preference to weather interesting navigation; the ninth in the English Channel and Northern Cantábrico; the tenth corresponds to the part of the Atlantic near to Portugal; and the eleventh to the Canaries. Naturally the limits of these zones cannot be perfectly defined, and it therefore remains for those who may make use of these services to discriminate, according to circumstances, whether the prognostication of one or other of the immediate regions is to be taken into account.

When, owing to lack of telegrams or other circumstances, the weather cannot be predicted as regards a specific district, the letter X will be substituted for the corresponding sign.

When it is required to signal the position of a cyclonic centre or line of squall (Grain) dangerous to navigation or aviation, the word "precaución" will be transmitted, and afterwards groups of six signs, which, if they refer to cyclonic centres, will commence with CI, and be followed by the group nnLLBB, in which the first two, nn, will indicate the latitude of the centre expressed in complete degrees; the third and fourth, LL, the geographical longitude also of the said centre to the east or to the west of the Meridian of Greenwich, expressed in complete degrees, those of the west, 01, 02, 03, etc., and those of the east by 51, 52, 53, etc.; the fifth and sixth signs, BB, will give the number representing the atmospheric pressure in millibars, omitting the hundreds. If it is a line of squall, it will be given in groups of eight signs, preceded by Gr, and followed by IILLBBDD, the first four, IILL, indicating the position of the point of the line at which the barometer is the lowest; the fifth and sixth, the atmospheric pressure at this point in millibars, and without hundreds; and the last two, DD, the direction of the line of squall at 13 h.

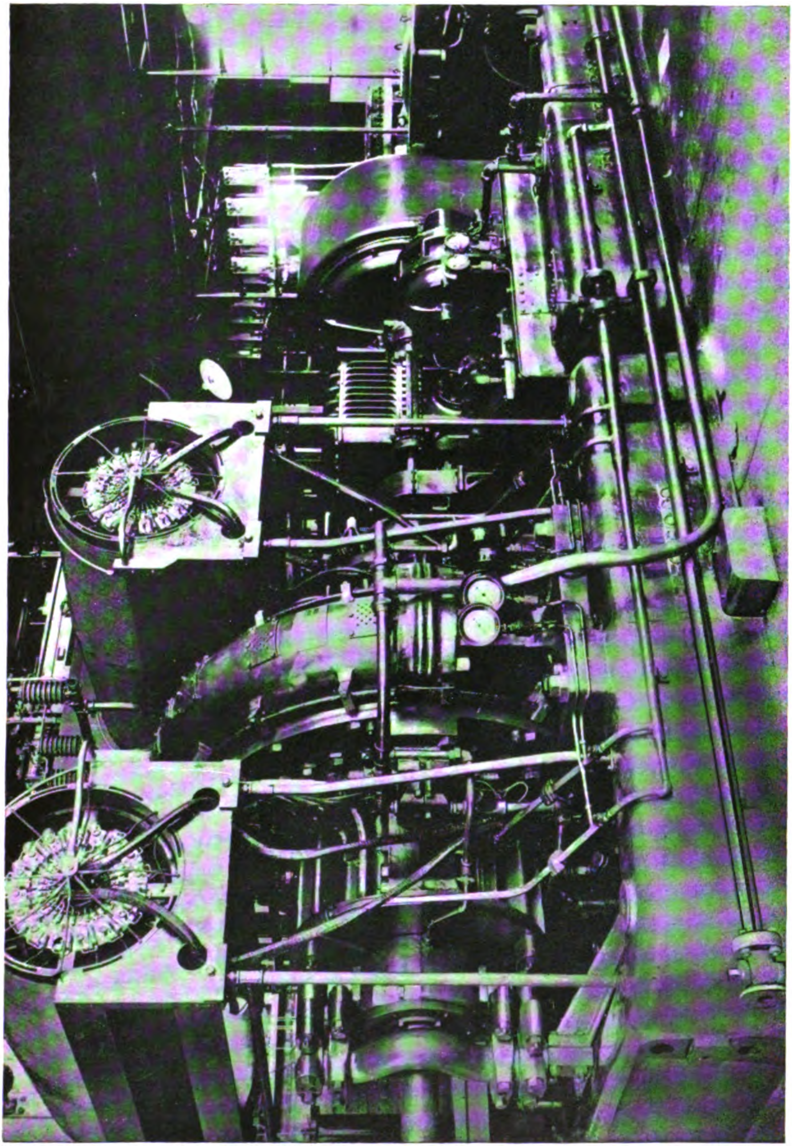
When a regular service of storm signals is established at ports, there will be indicated by a group of ten figures those signals which it is necessary to establish at different parts of our coasts. The successive signs will correspond to the parts of the coast as indicated below: 1, Cantabrian Coasts from Cape Higuer to Cape Mayor; 2, from Cape Mayor to Cape Estaca de Vares; 3, Galician Coast from Cape Estaca de Vares to the Portuguese frontier; 4, from Cape Creus to Cape San Antonio; 5, Balearic Islands; 6, from Cape San Antonio to Cape Gata; 7, Cape Gata to the Straits of Gibraltar; 8, Straits of Gibraltar to the Portuguese frontier; 9, East Coast of Africa (Tánger-Arcila); 10, Canaries.

Radiotelegram of 2030 h.

This will contain observations made at 18 h. at the stations 1, 2, 3 and 4 of the previous radiotelegrams expressed in the form indicated above.

General Remarks Appertaining to Radiotelegrams.

When the results of a meteorological station do not arrive at Carabanchel in time for transmission, the initial of the name of such station will be placed at the corresponding place in the radiotelegram with the words "no llegó" (not arrived).



200 K.W. ALEXANDERSON HIGH-FREQUENCY ALTERNATOR INSTALLED IN NAVAL RADIO STATION, NEW BRUNSWICK, N.J.

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If one or more of the groups of the station should be lacking, XXXXX will be substituted for each one of them.

If the soundings have not been made by the station, it will be sufficient to suppress the corresponding groups.

If the soundings have been made but are incomplete, XXXX will be substituted for the group or groups which are missing.

Regarding stations shown in the radiotelegrams which are situated on the coast, only particulars of the state of the sea can be given with precision for San Fernando, La Coruna and Mahón; therefore for the others the fifth figure of its fourth group will express the state of visibility of the horizon. (See instructions.)

The particulars regarding the state of the sea which are shown in a special group in the radiotelegram of 15.30 h., are those received from semaphores and certain vessels.

UNITED STATES OF AMERICA.

Transmission of Time Signals and Hydrographic Information by Naval Radio Stations.

The transmission of time signals to vessels at sea by means of radiotelegraphy was first accomplished in the United States in 1905, and this service, enlarged and extended, has continued to the present time. This service is of the greatest value to mariners, as it furnishes a means by which the time, as given by the transmitted signals, may be compared with a ship's chronometer and the error of the chronometer found. Similar comparisons over a number of days enable data to be obtained by which not only the error may be found but also the chronometer rate; that is, the rate at which it is gaining or losing.

The noontime signals on the Atlantic coast are sent out through the coast radio stations by connection with Western Union Telegraph lines from the United States Naval Observatory at Washington, D. C. By the operation of proper relays in electrical circuits, the beats of the seconds of a standard clock in the observatory are sent out broadcast as a series of radio dots, commencing five minutes before the time of the final signal. By omitting certain dots in a series, the comparison between the dots and the beats of the chronometer seconds can be checked until the instant of local noon (seventy-fifth meridian time) is reached. This is marked by a longer dot, which gives the time of exact noon. A comparison with the chronometer time at that instant gives its error referred to the seventy-fifth meridian time. Applying the difference in longitude, namely, five hours, between the seventy-fifth meridian and Greenwich, which is the standard meridian (or 0° longitude), the error of the chronometer referred to Greenwich time is determined.

Time signals are now sent out on the Atlantic coast only through the radio stations at Washington (NAA), Key West (NAR), and New Orleans (NAT). Signals from Washington and Key West are sent out every day in the year twice a day, viz., from 11.55 a.m. to noon and from 9.55 to 10 p.m., seventy-fifth meridian time. Time signals from New Orleans are sent out daily, including Sundays and holidays, commencing at 11.55 a.m., seventy-fifth meridian standard time, and ending at noon.

In case of failure of the Washington high-power station, the signals are sent out by the small set in the same station, and the stations at Boston, Newport, New York, Norfolk, and Charleston are notified, and they each send the signals broadcast.

On the Pacific coast the time signals are sent broadcast to sea through the naval radio stations at San Francisco (NPG), Eureka (NPW), Point Arguello (NPK), and San Diego, Calif. (NPL), and at North Head, Wash. (NPE). The controlling clock for each station is in the naval observatory at the Mare Island Navy Yard. Signals from San Francisco are sent out every

day from 11.55 to noon, and from 9.55 to 10 p.m., one hundred and twentieth meridian standard time. Those from North Head, Eureka, Point Arguello, and San Diego are sent out daily, excluding Sundays and holidays, from 11.55 to noon, one hundred and twentieth meridian standard time.

On the Great Lakes the time signals are sent broadcast through the naval radio station at Great Lakes, Ill. (NAJ), daily from 10.55 a.m. to 11 a.m., ninetieth meridian standard time.

To get the maximum clearness of signals, the receiving circuit should be tuned to that of the sending station. The wave lengths used are as follows

Washington	2,500 metres.
San Francisco	2,400 and 4,800 metres.
North Head	2,400 metres.
San Diego	2,400 and 9,800 metres.
Eureka	2,000 metres.
Great Lakes	1,512 metres.
Key West	1,512 metres.
Point Arguello	1,512 metres.
New Orleans	1,000 metres.

Both San Francisco and San Diego transmit time signals on undamped waves simultaneously with the transmission on damped waves, using an arc transmitter in each case. The arc transmitter is far more powerful than the spark transmitter, and the signals should be audible over a much greater range. They can, of course, only be received on apparatus specially equipped to receive undamped signals.

Information concerning wrecks, derelicts, ice, and other dangerous obstructions to navigation, whenever received from the Hydrographic Office or from a branch hydrographic office or other reliable source, is sent broadcast four times daily, viz., at 8 a.m., noon, 4 p.m., and 8 p.m., local (standard) time of station. Ships within range of a naval radio station should be prepared to receive these hydrographic messages at the hours mentioned and should avoid sending radio messages at these times. One vessel sending may prevent several others receiving information necessary to their safety.

Naval radio stations will furnish this information to passing vessels on request, whenever practicable, at other hours than those mentioned above. Should it not be practicable to send out this information on one of the hours scheduled it will be held until the next scheduled time and sent out as soon as practicable after each hour scheduled.

Each night at 10 o'clock, seventy-fifth meridian, immediately following the time signal, the naval radio station at Washington, D. C., will send broadcast such information relating to safe navigation as may be furnished it by the Hydrographic Office during the preceding 24 hours. The same wave length, 2,500 metres, used in the time signal will be employed.

PANAMA.

In addition to the stations listed as transmitting time signals, time is transmitted by Balboa (Canal Zone), call letters NBA, at 12.55 to 1 p.m. and at 4.55 to 5 a.m., seventy-fifth meridian time, on 7,000 metres. Undamped waves are used, but so interrupted by a chopper as to be audible on a crystal detector.

Also time is transmitted by Colon (Canal Zone), call letters NAX, at the same times, on 1,500-metre spark.

In this connection it will be noted that since the last list of call letters was published Darien has been operated by distant control from Balboa. The station is called Balboa, and the call NBA is used for both.

At 1 p.m. daily, 75th meridian time, a time-ball is dropped from the top of the mast on the Signal Station on Sosa Hill, Balboa.

The following table summarises the issues in a convenient form :—

Station.	Call Letters.	Wave-Lengths.	When sent.
		Metres.	
Washington	NAA	2500	Daily at 11.55 a.m. to noon and 9.55 p.m. to 10.00 p.m., standard time, 75th meridian. 0255–0300, 1655–1700 G.M.T.
Annapolis	NSS	1,700	Daily at 11.55 a.m. to noon and 9.55 p.m. to 10.00 p.m. standard time, 75th meridian. 0255–0300, 1655–1700 G.M.T.
Key West	NAR	1,500	Daily at 11.55 a.m. to noon, standard time, 75th meridian. 1655–1700 G.M.T.
New Orleans	NAT	1,000	Daily at 11.55 a.m. to noon, standard time, 75th meridian. 1655–1700 G.M.T.
Balboa, Panama ..	NBA	7,000 (arc)	Daily at 4.55 to 5.00 a.m. and 12.55 to 1.00 p.m., standard time, 75th meridian. 0955–1000, 1755–1800 G.M.T.
Colon, Panama ..	NAX	1,500 (spark)	Daily at 4.55 to 5.00 a.m. and 12.55 to 1.00 p.m., standard time, 75th meridian. 0955–1000, 1755–1800 G.M.T.
Cavite, P.I.	NPO	952 (spark) 5,000 (arc)	Daily at 10.55 to 11.00 a.m. and 9.55 to 10.00 p.m., standard time, 120th meridian, East. 0255–0300, 1355–1400 G.M.T.
North Head, Wash. ..	NPE	2,800	Daily at 11.55 a.m. to noon, standard time 120th meridian, West. 1855–1900 G.M.T.
Eureka, Calif. ..	NPW	2,000	Daily at 11.55 a.m. to noon, standard time, 120th meridian, West. 1855–1900 G.M.T.
Point Arguello, Calif.	NPK	1,512	Daily, except Sundays and holidays, at 11.55 a.m. to noon, standard time, 120th meridian, West. 1855–1900 G.M.T.
San Diego, Calif. ..	NPL	9,800 (arc) 2,400 (spark)	Daily, except Sundays and holidays, at 11.55 a.m. to noon, standard time, 120th meridian, West. 1855–1900 G.M.T.
San Francisco, Calif...	NPH	4,800 (arc) 2,400 (spark)	Daily at 11.55 a.m. to noon, standard time, 120th meridian, West. 0555–0600, 1955–2000 G.M.T.
Great Lakes, Ill. ..	NAJ	1,512	Daily, except Sundays and holidays, at 10.55 a.m. to 11.00 a.m., standard time, 90th meridian. 1555–1600 G.M.T.
Pearl Harbor, T.H. ..	NPM	11,200 (arc) 600 (spark)	Daily at 180th meridian mean noon. 2355–2400 G.M.T.

Transmission of Weather Reports by Naval Radio Stations.

Through co-operation with local offices of the United States Weather Bureau, weather forecasts are sent broadcast to sea through naval coast radio stations at certain times, varying with the locality. Coast stations are generally prepared to give local forecasts to passing vessels without charge, on request. Storm warnings are sent whenever received, and the daily weather bulletins are distributed by the naval radio stations at Washington, D. C., and Key West, Fla., a few minutes after the 10 p.m. time signal. These bulletins consist of two parts.

The first part contains code letters and figures which express the actual weather conditions at 8 p.m., seventy-fifth meridian time, on the day of distribution, at certain points along the eastern coast of North America, one point along the Gulf of Mexico, and one at Bermuda.

The second part of the bulletin contains a special forecast of the probable winds to be experienced a hundred miles or so offshore, made by the United States Weather Bureau for distribution to shipmasters. The second part of the bulletin also contains warnings of severe storms along the coasts, as occasions for such warnings may arise.

Immediately following this bulletin, a weather bulletin for certain points along the Great Lakes is sent broadcast by the naval radio station at Washington, D. C., consisting of two parts. The first part contains code letters and figures which express the actual weather conditions at 8 p.m., seventy-fifth meridian time, on the day of distribution, at certain points along the Lakes. The second part of the bulletin contains a special forecast of the prob-

able winds to be experienced on the Lakes during the season of navigation—about April 15 to December 10.

The points for which weather reports are furnished are designated as follows: *For Atlantic coast and Gulf points*, S=Sydney, T=Nantucket, DB=Delaware Breakwater, H=Hatteras, C=Charleston, K=Key West, P=Pensacola, B=Bermuda; *for points on the Great Lakes*, Du=Duluth, M=Marquette, U=Sault Ste. Marie, G=Green Bay, Ch=Chicago, L=Alpena, D=Detroit, V=Cleveland, and F=Buffalo.

All bulletins begin with the letters U S W B (United States Weather Bureau) and the weather conditions follow. The first three figures of a report represent the barometric pressure in inches (002=30.02); the next figure, the fourth in sequence, represents the direction of the wind to the eight points of the compass: 1=north, 2=north-east, 3=east, 4=south-east, 5=south, 6=south-west, 7=west, 8=north-west, and 0=calm. The fifth figure represents the force of the wind on the Beaufort Scale.

In order to simplify the code, no provision has been made for wind force greater than 9, strong gale, on the Beaufort Scale. Whenever winds of force greater than 9 occur, the number representing them is given in words of figures, thus: Ten, eleven, etc.

Examples of Code.

U S W B S 96465 T 91674 DB 94686 H 99886 C 01214 K 02622 P 03613 B 00065

Translation.

United States Weather Bureau.

Station.	Pressure.	Wind.	
		Direction.	Force.*
Sydney	29·64	SW	5
Nantucket	29·16	W	4
Delaware Breakwater	29·46	NW	6
Hatteras	29·98	NW	6
Charleston	30·12	N	4
Key West	30·26	NE	2
Pensacola	30·36	N	3
Bermuda	30·00	SW	5

* See Beaufort Scale.

U S W B Du 95826 M 97635 U 00443 G 96046 Ch 95667 L 00644 D 00842 V 01054 F 01656

Translation.

United States Weather Bureau.

Station.	Pressure.	Wind.	
		Direction.	Force.*
Duluth	29·58	NE	6
Marquette	29·76	E	5
Sault Ste. Marie	30·04	SE	3
Green Bay	29·60	SE	6
Chicago	29·56	SW	7
Alpena	30·06	SE	4
Detroit	30·08	SE	2
Cleveland	30·10	S	4
Buffalo	30·16	S	6

* See Beaufort Scale.

The naval radio station at Great Lakes, Ill., transmits a weather bulletin at 10 a.m. and 10 p.m., ninetieth meridian time, daily, on a wave length of 1,512 metres. This bulletin is similar to the second time, daily, on a wave length of 1,512 metres. This bulletin is similar to the second bulletin sent ou, by Washington station, and is for the States of Illinois, Missouri, Iowat Minnesota, North Dakota, South Dakota, Nebraska, Kansas, Wisconsin, and also for the upper lakes. Storm warnings are sent out as soon as received and broadcasted every four hours the next day.

PANAMA (CANAL ZONE).

Hydrographic information and weather reports, when received, are broadcasted immediately after 5 a.m. and 1 p.m. time at Balboa (NBA) on 7,000 metres (arc) and by Colon (NAX) on 1,500 metres (spark). At 5 a.m. Balboa (NBA) also broadcasts this information on 2,400 metres spark.

In addition to above, hydrographic information and weather warnings are broadcasted for ships in the Atlantic by Colon (NAX) and, for ships in the Pacific, Cape Mala (NNT), on 600 metres, immediately after receipt and at 8 a.m., noon, 4 p.m., and 8 p.m. (75th meridian time).

RADIO COMPASS STATIONS.

Radio compass stations have been installed on the Atlantic coast for the purpose of supplying vessels with bearings and positions. These stations are divided into two classes—those operating independently, and others, called harbour-entrance stations, operated under the control of a central control station at harbour entrances in order to guide vessels to the entrance buoys. The independent stations have been located with a view to giving good cross bearings to ships which are not over 150 miles distant from the coast, while the harbour-entrance stations have been located with a view to furnishing vessels with positions when they are within 50 miles of the entrance to the outer channel.

Harbour-entrance radio compass stations differ from those acting independently in that they are connected to and controlled by a central control station.

INSTRUCTIONS CONCERNING RADIO COMPASS STATIONS.

1. There follows a list of harbour-entrance radio compass stations:

Harbour entrance.	Compass-control station.	Radio call.
Boston, Mass.	Boston	NAD
New York, N.Y.	New York	NAH
Delaware Capes	Cape May	NSD
Chesapeake Capes	Virginia Beach	NCZ

The following radio compass stations take bearings for Boston:

Place.	Position.					
	Latitude.			Longitude.		
	°	′	″	°	′	″
Gloucester, Mass.	42	35	19 N	70	41	08 W
Deer Island, Mass.	42	21	15 N	70	57	30 W
Fourth Cliff, Mass.	42	09	40 N	70	42	22 W

The following radio compass stations take bearings for New York:

Place.	Position.					
	Latitude.			Longitude.		
	°	′	″	°	′	″
Fire Island, N.Y	40	38	07 N	73	12	32 W
Rockaway Beach, Long Island	40	33	52 N	73	52	40 W
Sandy Hook, N.J.	40	28	12 N	74	01	06 W
Mantoloking, N.J.	40	01	30 N	74	03	10 W
Montauk, Long Island	41	03	09 N	71	57	27 W

The following radio compass stations take bearings for Cape May:

Place.	Position.	
	Latitude.	Longitude.
	° ′ ″	° ′ ″
Cape May, N.J.	38 56 41 N	74 53 10 W
Cape Henlopen, Del.	38 47 26 N	75 05 16 W
Bethany Beach, Del.	38 32 45 N	75 03 20 W

The following radio compass stations take bearings for Virginia Beach:

Place.	Position.	
	Latitude.	Longitude.
	° ′ ″	° ′ ″
Hog Island, Va.	37 22 36 N	75 42 37 W
Smith Island, Va.	37 07 08 N	75 53 42 W
Cape Henry, Va.	36 55 16 N	75 59 51 W

2. To obtain a bearing from independent radio compass stations, call the station from which the bearing is desired in the usual manner and request bearings by means of a conventional signal given below. Simultaneous bearings from two or more compass stations can be obtained by making the call include the other compass stations desired.

3. To obtain bearings from harbour-entrance compass stations carry out the same procedure with the exception that the compass-control station should be called instead of the compass station.

4. When bearings are requested simultaneously from two or more compass stations the compass station which is farthest north will supply the ship with its bearing first; the others will then follow in the order of their north to south, or east to west, geographical location.

5. The following abbreviated signals will be used until further notice:

Signal.	Meaning.
QTE?	What is my true bearing?
QTE	Your true bearing is ——— degrees from ——— radio compass station.
QTF?	What is my position?
QTF	Your position is latitude ———, longitude ———.

6. The radio compass station (or compass-control station for harbour-entrance compass stations) will answer requests for bearings and positions in the customary manner of answering calls and follow their call letters with "K" if they desire to take a bearing at that time, "QRX" if they desire the vessel to stand by, or other abbreviated signal authorized by International Regulations.

7. On being told to "K" vessels desiring bearings or positions will transmit their radio call letters for 30 seconds and then make dashes 5 seconds long for 1 minute, making their call letters 3 times after each 5-second dash and terminating with the conventional signal "K" (go ahead).

8. At the expiration of the direction-determining signals the radio compass station (or compass-control station) will call the vessel, make "QTE," and send the bearing in degrees (0 to 359) and the name of the compass station which obtained the bearing, or "QTF" and the position in latitude and longitude. Bearings and positions will always be transmitted to the vessel in words to avoid error.

9. Vessels acknowledge receipt of bearings and positions by making the call letters of the station transmitting the bearing or position once, "DE," vessel's radio call letters, and then repeats the bearing or position received, using numerals.

10. Independent radio compass stations keep watch on 600 metres, and this wave length should always be used to call these stations; but, as soon as they answer, naval vessels will shift to tune "M" (952 metres), all transmission from the vessel being carried out thereafter on this wave length.*

11. The control stations for harbour-entrance radio compass stations keep watch on 600 and 952 metres. Naval vessels will call these stations on 952 metres and carry out all tests and communication with them thereafter on 952 metres.*

12. Merchant vessels will call all radio compass and compass-control stations on 600 metres and carry out all tests and communication with them thereafter on this wave length.*

13. Commanders of vessels should note that shore radio compass stations can not distinguish between the bearing of a ship and its reciprocal unless the reciprocal bears inland. There is, therefore, a possibility of an error of 180 degrees. In such cases the decision is left to the commander of the ship as to which is the correct bearing.

14. Subject to the foregoing, bearings should be accurate within 2 degrees of arc. When bearings from three or more compass stations are not over 2 degrees of an arc in error, but do not meet at a fixed point, the centre of an area inclosed by the bearings can generally be taken as the approximate position of the vessel.

15. The following U.S. naval shore radio compass stations are now in operation for the purpose of furnishing bearings to vessels in the West Atlantic:

Radio Compass Station.	Radio call.	Position.	
Gloucester, Mass. ..	NAD	Lat. 42° 35′ 19″ N	Long. 70° 41′ 08″ W
Deer Island, Mass. ..	NAD	Lat. 42° 21′ 15″ N	Long. 70° 57′ 30″ W
Fourth Cliff, Mass. ..	NAD	Lat. 42° 09′ 40″ N	Long. 70° 42′ 22″ W
Cape Cod, Mass.	NAE	Lat. 42° 02′ 58″ N	Long. 70° 04′ 32″ W
Surfside, Nantucket, Mass.	NBS	Lat. 41° 14′ 42″ N	Long. 70° 05′ 56″ W
Price's Neck, R.I. ..	NAF	Lat. 41° 27′ 06″ N	Long. 71° 20′ 15″ W
Watch Hill, R.I. ..	NAF	Lat. 41° 18′ 21″ N	Long. 71° 51′ 29″ W
Montauk, L.I.	NAH	Lat. 41° 03′ 09″ N	Long. 71° 57′ 27″ W
Fire Island, N.Y. ..	NAH	Lat. 40° 38′ 07″ N	Long. 73° 12′ 32″ W
Rockaway Beach, N.Y.	NAH	Lat. 40° 33′ 52″ N	Long. 73° 52′ 40″ W
Sandy Hook, N.J. ..	NAH	Lat. 40° 28′ 12″ N	Long. 74° 01′ 06″ W
Mantoloking, N.J. ..	NAH	Lat. 40° 01′ 30″ N	Long. 74° 03′ 10″ W
Cape May, N.J.	NSD	Lat. 38° 56′ 41″ N	Long. 74° 53′ 10″ W
Cape Henlopen, Del. ..	NSD	Lat. 38° 47′ 26″ N	Long. 75° 05′ 16″ W
Bethany Beach, Del. ..	NSD	Lat. 38° 32′ 45″ N	Long. 75° 03′ 20″ W
Hog Island, Va.	NCZ	Lat. 37° 22′ 36″ N	Long. 75° 42′ 37″ W
Smith Island, Va. ..	NCZ	Lat. 37° 07′ 08″ N	Long. 75° 53′ 42″ W
Cape Henry, Va. ..	NCZ	Lat. 36° 55′ 16″ N	Long. 75° 59′ 51″ W
Cape Hatteras, N.C. ..	NDW	Lat. 35° 14′ 22″ N	Long. 75° 31′ 42″ W
Cape Lookout, N.C. ..	NAN	Lat. 34° 36′ 13″ N	Long. 76° 32′ 15″ W
Morris Island, S.C. ..	NAO	Lat. 32° 41′ 33″ N	Long. 79° 53′ 15″ W

NOTE.—The following radio compass stations are temporarily out of commission: Fourth Cliff, Mass.; Cape Cod, Mass.; Surfside, Nantucket, Mass.; Price's Neck, R.I.; Watch Hill, R.I.; and Rockaway Beach, N.Y.

Where two or more of the foregoing compass stations have the same radio call it indicates that they are connected by wire telegraph to and under the control of a central control station, the radio call being the call of the central control station. When a request for bearings is made the central control station invariably answers with a bearing from each of the compass stations under its control.

* On and after April 1st, 1920, the 800 metre wave-length and no other will be used by all United States Naval shore radio compass stations. Between January 1st and April 1st 600 and 800 metres will be used.

SAMOA.

Local weather bulletins, preceded by the letter T are broadcasted by the Tutuila Naval Radio Station (NPU) at 8 a.m., noon, 4 p.m., and 8 p.m.

WASHINGTON.

News bulletins will be broadcasted by Washington on 2,500 metres (spark set) daily at 10 p.m. (seventy-fifth meridian time) immediately after time signals and weather report.

KEY WEST.

News bulletins will be broadcasted by Key West on 1,500 metres (spark set) daily at 10 p.m. (ninetieth meridian time).

SAN FRANCISCO (HILLCREST).

News bulletins will be broadcasted by the Hillcrest station daily on 600 metres (spark set) at 1.15 a.m. (local time).

HONOLULU (WAHIAWA).

News bulletins will be broadcasted by the Wahiawa station daily on 600 metres (spark set) at 11.30 p.m. (local time).

All Government vessels should copy this press in order that it may be posted on board for officers and crew.

(Change 92. Apr. 7, 1917.)

URUGUAY.

The station of Cerrito radiates each day (excepting Sunday) between 10 p.m. and 11 p.m. (Greenwich mean time) a radiotelegram, issued by the International Meteorological Institute, which contains the following information:

(*a*) The situation of centres of atmospheric movement in the southern part of the Continent in the zone between latitude 22° and the extreme south.

(*b*) Observations made at 12.20 p.m. (Greenwich mean time) by the Central Observatory at Monte Video and by stations of the National Service.

(*c*) The most important changes observed between 12.20 and 9 p.m. (Greenwich mean time).

NOTE.—For the wording of this radiotelegram the International Meteorological Telegraph Code will be used.

SPECIAL ARTICLES SECTION

(A) National Résumés :—

France

Germany

Great Britain

Holland

Italy

Japan

Norway

United States

(B) General Articles :—

The Progress of Wireless Telephony

Valve Amplifiers for Shipboard Use

Wireless Telephony and its Application to Aircraft

Direction Finding

The Berne Bureau

NATIONAL RÉSUMÉS

TECHNICAL PROGRESS OF RADIOTELEGRAPHY IN FRANCE DURING THE YEAR 1919

By Marius Latour.

THE technical progress of Radiotelegraphy in France during the year 1919 relates essentially to high-frequency alternators and to amplifiers utilising three electrode valves.

Referring to high-frequency alternators the Société Française Radioélectrique has put in service at the station at Lyons an alternator of 225 k.w. output at 20,000 cycles. This alternator is of the type described in U.S.P. No. 1,234,914 and B.P. 107,193. The machine of Lyons was designed for 150 kw. only. The number of revolutions is 3,000 per minute, and the peripheral speed only 150 metres per second. In order to reduce the air friction losses the rotor moves in vacuo while it is cooled by oil circulation. The speed is maintained constant during manipulation by a mere mechanical speed regulator of the Thury type. A so-called "compensating machine" on the same shaft was foreseen, which had to be loaded at the very moment when the high-frequency alternator was unloaded and vice versa (see B.P. 100,184), but practical experience has shown that this arrangement could be done away with.

The manipulation takes places by short-circuiting the alternator during the intervals between dots and dashes. The iron losses in the excited alternator are less by working at short circuit than by working at open circuit, so that this method of manipulation gives better results from the point of view of average efficiency. The reduction of the necessary power between dots and dashes means a reduction in the total kilowatt-hours taken by the transmission when compared with the arc.

It has been verified that it was possible to put several high-frequency alternators in parallel just as ordinary alternators. Experiments have been made by utilising high-frequency alternators of 20–40 kw., giving 32,000 cycles. Referring to the Poulsen arc, Mr. Elwell has contributed to its development in France, and it seems that a model of an arc has been established in France which is much lighter than American arcs.

New high-frequency amplifiers with iron-core transformers have been utilised. The magnetic circuit comprises a comparatively large air gap so that the transformers take an important magnetising current. Capacities are branched in parallel to the primary or secondary windings, which absorb a leading wattless current equal to the lagging magnetising current of the transformer. There is thus obtained the condition of resonance which gives the maximum amplification for a given frequency or wave length (see B.P. 130,022). The amplifier is tuned for the received wave length at every stage and possesses a remarkable high selectivity. There is a real improvement from the point of view of atmospherics.

In the same manner low-frequency amplifiers utilised after detection have been built which are tuned for any given musical note of

heterodyne reception. The low-frequency transformers have a magnetic circuit with an air gap and capacities connected in shunt at their terminals.

By cumulating both effects of high-frequency and low-frequency selection it has been possible to receive the American station of Annapolis at the station of Lyons (one kilometre from the foot of the antenna), while the station of Lyons was transmitting at full power with a wave-length only 2½ per cent. different from the wave-length of Annapolis.

To appreciate the importance of the obtained amplification it will be sufficient to say that the American station of Annapolis may be received (and telegrams properly read) by utilising a receiving coil having only 25 cm. in diameter with an amplifier of 10 valves. This number of valves comprises the detecting valve, and the valves are of the well-known French type (S.B.P. 126,658).

Resistance amplifiers, which seem to have been first employed by French engineers (since 1915), have also been developed.

Referring to wireless telephony it seems that performances have been achieved in France, at least for moderate powers, which may be compared to what has been done abroad. It has been found that it was possible to develop more oscillating power with valves operating as high-frequency amplifiers rather than with valves operating as self-exciting generators, so that it may be preferable to have the microphone controlling a small valve generator which excites the grid circuit of other valves working as amplifiers. (See, for example, B.P. 131,362).

Good results have been obtained in wireless telephony by utilising the same valves for generating the high-frequency current and for amplifying the microphonic current (see B.P. 132,118).

The plate current of the valves is taken from an alternating-current source, and the alternating current rectified by two valves according to B.P. 131,697.

For the reception of wireless telephony experiments have been made in order to utilise a local generator for obtaining the well-known heterodyne amplification (see Latour, *Electrical World*, April 24th, 1915), also for wireless telephony.

TECHNICAL PROGRESS OF WIRELESS TELEGRAPHY IN GERMANY DURING 1919

By Dr. Eng. A. Meissner.

ENTIRELY isolated from the rest of the world during the war, German radio-engineers were compelled to resolve the numerous problems presented by the necessity of the military action. Enormous was the progress in this line of science in spite of such difficulties.

So far, high-power plants appear to have reached the highest degree of perfection. In 1914 the quenched spark up to 100 kw. was the prevailing system. By such means it was possible to keep up communication with the German colonies Togo, Windhuk (S.W.A.), and between the latter two, during about six hours every morning.

The most efficient wave-length was found to be about 5,500 metres. Soon it became necessary to manage the foreign and essentially the American service by aid of the high-frequency alternator. In this line of work the Nauen station has shown an unexcelled efficiency, as far as continuity of service and reliability are concerned. During the whole time of the war the Arco H.F. alternator, combined with the static frequency transformers, kept up a continuous service. During months the machine worked for nearly 24 hours a day, while the aerial energy—the aerial is now sustained by two 260-metre (780 ft.) steel towers—was raised to 400 kw. In the new improved plant the aerial energy can be increased to 800 kw. by running the two alternators in parallel.

Operating the key acts upon a series of relays which short-circuit a number of resistance-boxes inserted in the first stage of the frequency transformers. The relays have been greatly improved, allowing a speed of 50 to 80 words per minute.

Lately the large quenched spark transmitter had to be removed entirely since it interfered with the extremely busy short distance stations.

In case musical signals have to be emitted, as, *e.g.*, for time signals and weather reports, one of the frequency transformers of the H.F. machine must be excited by an audible frequency instead of with direct current.

Another method is the production of two different frequencies in the same set of transformers, the interference of which gives the musical note.

All transmitters for continuous waves emit several overtones in addition to the fundamental period. With H.F. machines the intensity of the former hardly exceeds 1/1,000 per cent. of the fundamental period, but, in spite of this small energy, receiving stations located near the sender are disturbed. By a simple arrangement of circuits shunted across the terminals of the frequency transformer, and particularly by the use of an infinite-impedance-circuit tuned to the fundamental period, the overtones are entirely cut out, because the large capacity of the auxiliary shunt circuit represents a dead short-circuit for the high frequency of the overtones. A great advantage of the Nauen station is the possibility to send with two transmitters at once. To comply with the numerous requirements of service, the Nauen station has been greatly improved. A huge monumental building, designed by one of the most eminent German architects, contains the whole of the transmitting plant, three H.F. alternators, a large valve generator, and, for cases of emergency, a quenched musical spark transmitter.

A special receiving plant, containing telephone and recorder receivers, has been constructed at a distance of 30 kilometres (20 miles) from Nauen. This duplex receiving station is able to take messages from all high-power stations in the world.

The smaller types of quenched spark sets have reached a high degree of perfection. The highest development, as in other countries, can be noted among trench and aeroplane sets. (Aerial energy, 50 to 100 watts.)

The transmitters of the small power sets were of the quenched

spark system; the primary energy was produced by a hand- or foot-driven (in flying machines, air-driven) 500-cycle alternator; in some cases by a high-speed hammer interrupter.

The great era of trench instruments began when the valve amplifier was admitted in the short distance trench service. Due to the improvement of receiving instruments and the employment of amplifiers, the sending energy could be greatly reduced and badly radiating earth antennæ could be employed. It was in 1913 when the Telefunken Co. tried to replace the gas-filled Lieben relay by highly evacuated lamps. In early 1914 the first technically perfect amplifiers appeared on the market. Higher and higher became the ratio of amplification, smaller the volume of the instruments, and the plate voltage, which had originally been as high as 100 volts, could be reduced to 24 volts. Lately, even 12 volts have been successfully employed. However, for such a small potential a double grid is necessary. The energy required to heat the filament could be lowered from 1·6 to 0·4 watts. It has even been tried to construct valves without filament, containing a potassium cathode (Kossel-Marx). The number of audion valves manufactured in Germany during one week reached 10,000.

The valve generator means an enormous advance for German wireless practice. The first trials to produce oscillations by means of a cathodic valve took place early in 1913; they formed the starting point for the development of valve generators in England and America. They were carried out with a Lieben valve, a gas-filled type of lamp. In 1914 the author left this method in order to pass entirely to high-vacuum bulbs for sending purposes. The greatest difficulties lay in the process of evacuation and in the construction of the grid. Finally, the best results were obtained by the author's system of a grid coiled on a special metal frame. The filament is made of wolfram, the plate of tantalum or iron.

The introduction of valve generators into practice began in the middle of 1917, and progressed rapidly. Most of the transmitting instruments are remarkable for the ease with which they can be adapted to all kinds of service. The same 20 w. valve generator can be linked to a high or low aerial; it is able to send musical and continuous wave trains, the schedule of wave-lengths is continuous. Highly damped aerials require an intermediate circuit, the efficiency of which is nearly the same as that of a directly coupled transmitter.

Directly coupled aerials are mostly arranged in such a way that the plate is tapped off the aerial inductance. The grid is then either inductively coupled or connected to a condenser inserted in the aerial circuit.

With intermediate circuit transmitters the plate, as well as the grid, is tapped off a part of the intermediate circuit self-induction coil.

The usual sources of energy for the different transmitters are the following:—For 10 to 20 watts aerial energy, a 600 volt D.C. dynamo; for 100 watts aerial energy, a 1,400 volt D.C. dynamo; for 200 watts up to 1 kw. (two valves in parallel), and 5 up to 10 kw. (10 to 20 valves in parallel), an alternator of 500 cycles or more.

So far, the energy of a single valve has not yet exceeded 2·5 kw. In order to produce high-tension D.C. up to 1 kw. a new type of

rectifier with oxide-coated cathode and gas filling, resp. a high-vacuum rectifier, has been developed. Larger amounts of energy require a mercury vapour lamp.

Valve generators are mostly furnished with microphone sets, which act either upon the grid or upon the plate current. With small aeroplane sets the microphone was mostly inserted in the aerial.

Lately, the valve generator is employed on a huge scale by the German General Post Office to aid the telegraph lines, which are unable to manage the actual service. For this purpose a large net of wireless stations is being organised all over the country, so that all principal cities in Germany are linked up by wireless telegraphy with the capital.

Quite a new line of business has been opened to wireless telegraphy by the employment of valve generators, originally constructed for wireless telegraphy, for multiple telegraphy and telephony on ordinary wire lines. It has been possible to converse over a distance of 400 to 600 kilometres (400 miles) with four conversations at once without the slightest difficulty. The transmitting energy hardly reaches 10 watts, the current in the line being only 0·1 ampere—values which can be allowed anywhere. The instruments are arranged in such a way in the main office that the subscriber does not even know he is speaking by high frequency.

For about one year a telephone line between Berlin and Hanover has been working daily with three conversations at a time. Also, a Siemens high-speed recorder between Berlin and Frankfort-on-Main is working duplex on the same principle. The first improvement of the receiving instruments was the introduction of the carborundum detector, which has lately been excelled by the audion valve, the latter being used as well with as without beat reception. The advantage of the German receivers is the absolute constancy of retro-action and beat effect offering highest degree of sensitiveness for every wave-length within the provided schedule of frequencies. No readjustment of couplings is necessary when the receiving wave-lengths have to be changed.

In long distance receiving stations mostly high-frequency amplifiers are employed, combining them with small valve generators, using the heterodyne method. A very interesting receiving instrument for undamped oscillations is the so-called "sounder." By a very simple and precisely working interrupter a beat effect similar to that of the tone wheel is obtained. The receiving energy is then led into the head telephone, not at every H.F. alternation, but only 1,000 to 3,000 times per second. The sensitiveness of the instrument is nearly equal to that of the heterodyne audion receiver.

For directive reception, radial aerials like those of the Telefunken compass were originally employed. A dial commutator allows the receiver to be connected in turn to the different aerials. Later on, simple turning loop aerials took the place of the directive antennæ.

The most important question of mechanical relays has found a new solution by the cathodic valve. By using the asymmetric points on the characteristics of cathodic valves combined with more or less retro-active coupling the author found the solution. The grid, being

influenced by the receiving current, must be adjusted to a certain positive or negative potential, so that great variations in the plate current are able to act upon a relay. Similar solutions were later found in England and America. The relay was arranged to work a Morse inker, a rapid recorder, or an electric trumpet signal. The remote control boat steered from an aeroplane along the Flemish coast contained similar devices.

With respect to aerials, it is to be remarked that the principal laws concerning the influence of height, shape and length of aerials, counterpoise, and earth have been generally recognised. The main result is that the sending effect is proportional to the square of the mean height of the aerial and nearly independent of the length and shape of the aerial.

The receiving effect is proportional to the square of the height, and also to the length and surface of the aerial. Measurements of the absolute values of the radiation have shown that the radiating effect of an aerial actually corresponds with the theoretical values.

Thus, in practice, measurements of radiation are not necessary, and it is sufficient to insert in the formulæ of the radiation resistance the mean capacity-height (*i.e.*, the total capacity of the aerial multiplied by its effective height).

An important fact is the decrease of the aerial resistance for long waves when the surface of the aerial is raised. This is due to the reduction of the density of current in the aerial. Therefore it must be admitted that the increase of the aerial resistance for increasing wave lengths is often a consequence of insufficient aerial capacity.

TECHNICAL PROGRESS OF WIRELESS TELEGRAPHY AND TELEPHONY IN GREAT BRITAIN DURING 1919

By N. W. McLachlan, D.Sc. (Eng.), M.I.E.E.

IN writing a *résumé* of the advancement of Wireless Telegraphy and Telephony during the past twelve months, it is almost impossible to discriminate how much was accomplished in that time without the inclusion of matter belonging to previous years. This is a direct result of the secrecy necessitated by the exigencies of the Great War.

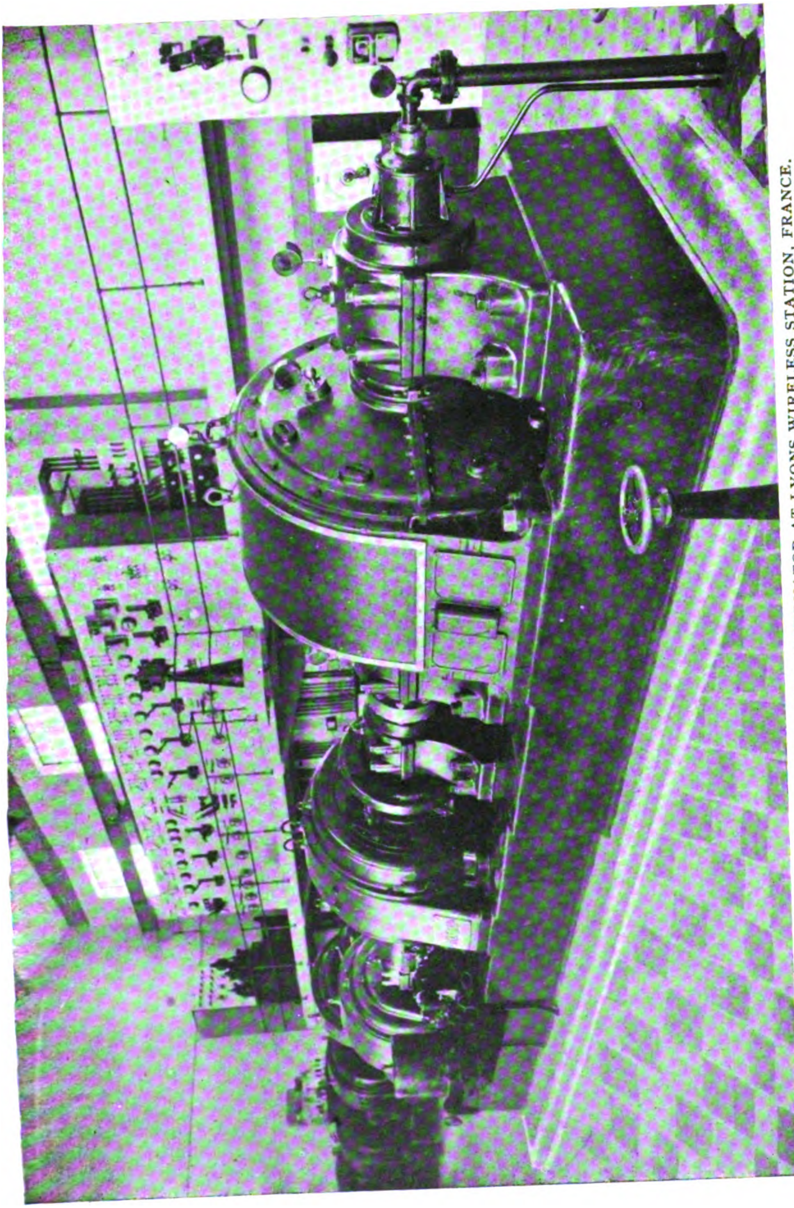
In the initial stages of any branch of knowledge,—especially one which can be immediately applied to commercial, industrial or domestic purposes,—during the last thirty years or so, progress has been comparatively rapid. A stage is reached, however, when the main lines of development are worked out, utilising known principles and salient phenomena. Further progress can only follow by a detailed investigation of what may be termed minor phenomena, although these are of vast importance in the sequence of events. Such phenomena require for their elucidation apparatus of a delicate nature and of complex design. Research work of this kind sometimes culminates in epoch-making discoveries which reveal hitherto undiscovered major phenomena. The best known case in point is, of course, the thermionic valve.

There are two main aspects of our subject which can be studied: (1) The direct advancement of our knowledge of new phenomena and new principles—*i.e.*, advances in pure research (2) The application of these or of older phenomena to industrial and commercial purposes. In this article we propose to confine our attention principally to the second of these topics.

We have already stated that the invention of the valve is one of the most epoch-making events in modern physical science. Its applications in Radiotelegraphy and Telephony and in various branches of scientific work are multifarious. Valves capable of yielding 1 or 2 kw. of high frequency power are now quite common, and have applications in small transmission units. For long-distance work these valves are of little value when used individually, but the input at the transmitting end can be augmented by parallel working. Valves, however, are somewhat akin to microphones, in that correct phasing or synchronous working is difficult to obtain. Consequently " n " valves in parallel will not give " n " times the power supplied by one valve. It is possible, however, to obtain correct phasing of two valves by joining the grids by an inductance coupled to the oscillatory circuits. Considerable progress will doubtless be made in this direction during the coming year, and valve transmission sets of large power can be anticipated.

The operation of large valves depends among other things on the voltage applied between the anode and the filament. This must be a direct current or steady supply of the order of 5,000 to 10,000 volts or more. Since high-tension direct-current working has not been adopted in this country, and since valves are used in many circumstances where a high-tension arc supply from a transformer. In order to smooth were in existence, it is necessary to employ diode valves to rectify a high-tension a.c. supply from a transformer. In order to smooth out the current wave, a condenser of large capacity is necessary. Considerable advantages arise by using polyphase currents of higher frequency than that used commercially, in which case the capacity of the smoothing-out condenser is reduced very much. This scheme is more feasible than several high-tension d.c. generators in series.

The valve has put Wireless Telephony in a totally different position from that which it occupied when the arc was the usual means of transmission. The oscillations from the latter were discontinuous and generally not of the pure sine variety, whereas both of these defects are eliminated by means of the valve. At the receiving end, the amplifying action of valves has led to great improvements in telephony and in long-distance telegraphy. Although considerable attenuation of speech occurs in long-distance wireless telephony, this can be surmounted at the receiving end by the aid of suitable circuits and valve amplifiers. One great advantage over cable or wire telephony is the absence of distortion during transmission, arising from the different velocities of propagation along the cable, although the effect of this is mitigated by the adoption of loading coils. The possibilities of wireless telephony were amply demonstrated by the Marconi Co. in May, 1919. Using a portable apparatus, including a ½ kw. alternator, step-up transformer and valve rectifier, speech was transmitted over



200 K.W. LATOUR HIGH-FREQUENCY ALTERNATOR AT LYONS WIRELESS STATION, FRANCE.

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flat country up to sixty miles. With the same set the range for C.W. telegraphy is 200 miles. Both of these distances can be appreciably augmented under favourable conditions. The application of wireless telephony to aircraft is of considerable interest, and a successful demonstration was given before the Institution of Electrical Engineers in May. The most notable achievement in wireless telephony, however, is the transmission of speech from the Marconi Station at Ballybunion to Nova Scotia, a distance of 1,800 miles. This was accomplished using an umbrella type aerial 500 feet high, two triode valves supplied with only 2·5 kilowatts, and a third triode for control purposes. The current in the aerial was 16 ampères, and the wave-length 3,800 metres. Progress has been made in the design of apparatus for the reception of C.W. signals on the heterodyne principle, and difficulties which arise due to radiation from the receiving station are being surmounted.

Valves have also been applied to the recording of time signals from the Eiffel Tower in order to determine the errors in clocks. This is of importance in enabling time signals to be distinguished from atmospherics or strays, which are always a source of annoyance in auditive work. The accuracy of the measurements obtained is of the order of 10^{-2} second. Further uses of the valve are found in determining the ratio e/m, in operating as a trigger relay, in sustaining the vibrations of a tuning fork, in producing the rotation of a toothed disc from a d.c. supply without the aid of a commutator, and in obtaining a very large range of harmonics, these being tuned out by resonance circuits. The latter can be used in the absolute determination of frequency and wave-length, the measurement of which, hitherto, has been dependent on a calculated inductance and standard capacity, theaccuracy attained with the latter being little better than 1 per cent.

For many years problems in wireless were largely concerned with efficient transmission and reception. As time went on, and the radio art progressed, wireless engineers turned their attention (*a*) to the propagation of signals in definite directions, and (*b*) to the problem of ascertaining the direction from which received signals came. Much progress has been made in direction-finding, especially in regard to the navigation of ships in harbour mouths, and the navigation of airships and aeroplanes. The chief feature of the Marconi direction-finding apparatus is the movable search coil which is rotated until its plane is at 90° to the directional line of the signals. This occurs when the signal strength is a minimum. On aircraft, owing to engine noise, it is necessary to use the position of maximum signal strength. For this purpose an auxiliary coil is fixed at 90° to the search coil, the two being rotatable about a common axis. The auxiliary coil is switched alternately in series with and in opposition to the search coil, the latter being moved meanwhile, until there is no alteration in signal strength. The search coil is then in line with the direction of propagation of the signals. When two stations are transmitting signals it is possible for an airship or an aeroplane to obtain her bearings. One of the outstanding examples of aeronautical wireless is the performance of the R.34 on her transatlantic trip. Fitted with a Marconi C.W. valve set and also a spark set, she was always in touch with both sides of the Atlantic, and exchanged signals up to distances of 1,600 miles.

A step in the right direction and one of paramount importance in commercial and civil life, is the equipment of all sea-going vessels of over 1,600 tons with wireless gear. By means of systems of signals it is possible to facilitate navigation of ships fitted with wireless apparatus through dangerous passages under all weather conditions. In particularly narrow harbours and passages, ships can be guided by signals of audio-frequency transmitted along a submarine cable and picked up on a receiving set. In this way the ship can follow the line of the cable. The construction of radiophares round the coast will help the shipping world considerably during adverse weather conditions, since the question of visibility does not arise.

Several attempts have been made to construct wireless-controlled aircraft and seacraft. These cannot yet be said to have given complete satisfaction, and there is room for much improvement. The difficulties to be overcome are formidable, but it is merely a matter of time and the exigencies of the situation, till a successful design will be evolved.

Turning our attention now to high-frequency iron-cored apparatus —*e.g.*, alternators, voltage transformers, frequency changers, and the like—these machines have been developed more on the Continent and in America than in this country. On a large scale C.W. telegraphy is conducted by the Marconi C.W. spark system, Poulsen arcs and H.F. alternators. Valves are not yet obtainable in large enough units to compete with arcs and alternators. There might, therefore, be more progress in the construction and design of alternators and allied apparatus, although difficulties arise in obtaining material of suitable quality, say, Stalloy 1 to 2 mils thick. Long waves of from 6,000 to 12,000 metres—*i.e.*, 50,000 ~ and 25,000 ~ per sec., respectively—are coming into use, and the operation of H.F. alternators at these frequencies, especially when frequency raisers are employed , is not accompanied by abnormal peripheral speeds.

The measurement of signal strength and the cause and elimination of strays are still occupying the attention of workers in the field of Radiotelegraphy. Although it is of the utmost importance to suppress these disturbances, the solution of the problem cannot approach the region of finality until the causes of the various kinds of strays and the precise function played by the atmosphere in the propagation of electromagnetic waves are known. In this respect, interesting and useful information was gained during the solar eclipse on May 29th, 1919. The effects of the eclipse were examined under three heads : (*a*) strays ; (*b*) signals not crossing the umbra or denser part of the shadow ; (*c*) signals crossing through or near the umbra. The results showed that there was no noticeable change in the frequency or intensity of the strays. On ships at sea an improvement was obtained in some cases, but the reverse in others. Generally speaking, there was an improvement in signal strength similar to that after nightfall. The increase in strength was observed long before the umbra intervened between two stations, so that ionising processes preceded the arrival of the umbra. The effect was particularly marked between Meudon (Paris) and Ascension Island. When the umbra was between these stations, signals were audible, but faded as the umbra passed away.

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An inspection of the above literature will reveal the names of additional investigators engaged in the work described. In the patent records for 1919 the names of many persons in the Marconi and other companies who contributed to the progress of wireless telegraphy and telephony will be found. (*See* "Review of Radio Literature" in *Radio Review*, October, November, December, 1919.)

TECHNICAL PROGRESS OF RADIOTELEGRAPHY IN HOLLAND DURING 1919

By Balth. van der Pol, jun., D.Sc.

IT is with pleasure that we accept the invitation of the Editor of this Year-Book to give a short account of the progress in wireless telegraphy made in Holland during 1919. It seems desirable, however, to extend the scope of this report over a somewhat longer period, as most activities in the field of wireless, as far as Holland is concerned, are closely related to the outbreak of the European War.

It is well known that the Dutch forces were mobilised during the whole period of the war; and soon after the beginning of hostilities the need for small portable and military stations was badly felt. At this time only a few small sets mounted on motor cars were at hand, while some others of bigger size were ordered from abroad, but the latter orders could, of course, not be executed. As, at the outbreak of war, no radiotelegraphic industry of any importance existed in this country, Holland was confronted with the difficulty of designing and manufacturing all her own apparatus. The army, together with some private undertakings, soon succeeded in building a fair number of military motor-car stations suited for field work, with a working range of about 200 kilometres, using two masts of 30 metres height.

Also several coast and land stations were erected, principally manufactured by or under the supervision of a special army department charged with the building and maintaining of W.T. apparatus. Nearly all these stations were designed to work with the well-known quenched spark of the Telefunken type. For the use in aircraft at first only transmitting sets were constructed, but afterwards the introduction of amplifying triodes made reception through the disturbing noise of the engine possible. Finally, low-power stations to be carried on push or motor cycles (0·75 k.w.), as well as small trench sets, were built, batteries of secondary cells being used to supply the energy.

Attention has been paid not only to wireless telegraphy, but experiments are also being carried out now with small radiotelephony sets, while the definite introduction of wireless telephony for the use of aircraft can shortly be expected, thus simplifying considerably the training of the operators.

As during the war all Dutch wireless apparatus, including thermionic triode valves, had to be manufactured in the country itself, the military necessity can be considered to have given, here as elsewhere, a strong impetus to the national radio industry, and in consequence in Holland several manufacturing companies were either established or enlarged, now being able to supply the merchant fleet as well. Of the considerable number of 192 ship sets owned by the Dutch Telegraph Co., "*Radio-Holland,*" some fifty are of Dutch manufacture, another 150 sets being in course of construction.

Our main land station, "Scheveningen-Haven," is principally used for communication with ships at sea. This station, which was erected in the early days of W.T., is now found to be out of date, so that a complete modern installation of 30 k.w. has been ordered by the Government to be built by the Dutch Hilversum works (Seintoestellen fabriek).

Both Holland and her vast colonies, the Dutch East Indies, have for a considerable time eagerly awaited the linking up of the two by means of wireless. An important step towards the accomplishment of this plan was a thesis presented, June, 1916, by Mr. C. J. de Groot, entitled "*Radiotelegraphie in de Tropen.*" In this thesis, which contains the reports of a considerable amount of interesting experimental work carried out in the Dutch East Indies, Dr. de Groot advocates the possibility of linking up Holland with her colonies without any intermediate relaying station. Afterwards a high-power arc station was erected by Dr. de Groot at Malabar (Java). At the same time, in Holland, with the aid and encouragement of the Government, Messrs. T. P. van den Bergh and A. Dubois carried out some preliminary experiments for the design of a power arc suited for direct communication between Holland and Malabar. Though in a special report (July 26th, 1918) of a scientific committee, consisting of Professors Haga, Lorentz, Wertheim Salomonson, Zeeman and Mr. Lulofs, great appreciation was expressed for the results already obtained with the exclusive use of Dutch means, they expressed the opinion that the establishment of a reliable wireless communication between Holland and her colonies (distance 12,000 kilometres, mainly over land) could not be considered to be assured by these experiments within a short period. Thereupon, September, 1918, a contract with the Telefunken

Company was signed for the building of a high-power transmitting station (high frequency alternator) of 400 kw., to be erected at Kootwijk (near Apeldoorn), while the receiving station for simultaneous transmission and reception, which was recently completed, has been placed near Boxmeer (Limburg).

Meanwhile, with a Dutch receiving arrangement near Huizen (Zuider Zee) which was erected for that purpose, Mr. A. Dubois has succeeded since June, 1919, in receiving the signals transmitted by the Dutch East India station, Malabar, as well as those from a provisional Telefunken station at Tjililin (Java). It may be interesting to mention the fact that the Malabar station works with what is probably the highest antenna used up to now. This aerial, which has a height of 1,000 metres, is suspended from a horizontal cable fixed at both ends at two mountain tops 2 kilometres apart. The energy dissipation in the surrounding material seems not to affect to a very considerable extent the wave-amplitude at big distances.

We cannot conclude this report of Dutch wireless activities withouf mentioning what we consider to be a happy sign : we mean the increasing interest paid by Dutch scientists and engineers to the vast field ot experimental and theoretical research in wireless telegraphy and electromagnetic waves in general. For we can only get at the bottom of such complicated phenomena as, *e.g.*, radiation and transmission of electromagnetic waves, after pursuing both in the laboratory and in the study the highly interesting course of patient observation and calculation.

THE TECHNICAL PROGRESS OF RADIO-TELEGRAPHY IN ITALY DURING 1919

By COMMANDER G. PESSION,

Cruiser Captain, Royal Italian Navy.

BETWEEN the Italian Government and Senatore Marconi there has existed from the earliest times of radiotelegraphy a special agreement in virtue of which Senatore Marconi places at the disposal of the Royal Italian Government all his radiotelegraphic and radiotelephonic patents and those of his companies, with the right to reproduce and modify the said apparatus.

For this reason the development of radiotelegraphy in Italy is closely allied with that of the Marconi Company, and the Royal Government, in order to be able to enjoy the right to reproduce such apparatus, many years ago created and developed radiotelegraphic works, which, in progress of time, have greatly specialised its activities. The Government not only constructs excellent apparatus but also undertakes the study of modifications and improvements of such apparatus.

Of all branches of State administration, the Navy Department has most contributed to the progress of radiotelegraphy in Italy, and, in fact, that Department actually controls nearly the whole of the stations.

This specialisation, by an Administration, in the radiotelegraph service has yielded excellent results as regards the unification of policy and standards.

Italy at present possesses, in addition to the military wireless stations of the Royal Army, which perform special services, and the stations of the Royal Navy, which number 250, 61 coast stations, six wireless telegraph stations performing international services, 21 colonial stations, besides numerous other radiotelegraph stations of a special kind, such as radiogoniometric receivers, etc.

All these stations are under the control of the Royal Navy.

The present tendency is to substitute, in all services with the exception of ship stations, continuous wave apparatus in the place of the spark system.

The system which is now largely applied is that of the arc, which on account of the simplicity and facility with which it may be employed specially renders it suitable for manipulation by staffs which are not greatly specialised. This method was utilised during the war.

At the same time transmitting apparatus with Marconi valves are now being adopted and constructed for all purposes for which the arc has been found less suitable.

After many years of study as to the best models of arcs existing in commerce, the Navy Department has devised and produced a special type which gives excellent results.

During the recent cruise at sea by the Royal vessel, *Conte di Cavour,* with a 3 kw. arc set, good daylight communications in both directions were maintained with Rome up to a distance of over 3,000 kilometres.

The most powerful apparatus of this type employed on board warships is a 30 kw. model, which gives a current of about 50 ampères in an aerial having a capacity of about 0·003 microfarads and a wave-length of 3,000 metres.

The Naval Radiotelegraph Works have also constructed a model of 100 kw., which is being systematised at Massaua and will effect communications between Eritrea and Italy in place of the present spark apparatus which has been installed for many years at Massaua.

The largest radiotelegraph centre is near Rome, where there are two transmitting stations, one being an arc station with a power of 200 kw. and the other a spark station of about 60 kw.

These two stations are served by a single receiving station connected with them by telegraph circuits. The receiving station is situated in the district of Monterotondo, about 20 km. from Rome, and is fitted with a number of frame aerials of various dimensions, some of which are fixed and some revolving.

A judicious arrangement of the circuits enables six receiving sets to be worked simultaneously for the maintenance of distinct services without mutual interference.

These receiving services are always possible, even during the simultaneous transmission of the two wireless transmitting stations, and admit of the handling of an extremely heavy traffic amounting sometimes to 300,000 words per month.

For reception from America a fixed frame aerial is normally used, being accurately directed so as not to be affected by the transmission of the great Rome Station, and having approximate dimensions of

15 metres by 10 and composed of 10 turns of covered wire spaced about 5 centimetres from each other.

Extended experiments have been conducted with the most varied types of frame, with variations of size, of the number of turns, of the type of wire used, and finally of the distance between the turns, satisfactory results being obtained, and in each case determining the characteristics of the frame most satisfactory for a given reception.

The amplifiers used are of various models and are fitted with lamps constructed at the "Istituto Elettrotecnico e Radiotelegrafico," of Leghorn, where there is a complete plant to produce the very high vacua necessary.

During the development of the long-distance service, using for reception the normal aerial, long interruptions unfortunately occurred, which in the worst months of the year seriously impeded the efficiency and continuity of the service.

Since the application of the frame aerials the number and the duration of such interruptions have greatly decreased, and the development of the service has assumed a stable character.

Although comparative tests of receiving systems are very difficult and uncertain when executed with laboratory methods, there is no doubt that such a prolonged test in actual working as has been made by the stations of the Italian Navy proves much in favour of the system of reception with frames.

After the strenuous war-time work, during which the radiotelegraph stations were constructed rapidly on military standards, the necessity has been felt for the establishment in Italy of a great station capable of handling a heavy and continuous long-distance traffic.

This work is at present in course of development by the Navy, with the collaboration of Senatore Marconi, and the new station will be built at Coltano, near the existing one.

To support the aerial, four large steel towers, placed at the sides of a square 400 metres wide, and insulated at the base, will be erected.

At this station Marconi high-frequency alternators capable of giving 200 kw. in the antenna, and also Poulsen arcs of the same power, will be installed.

These transmitters will be operated at a distance by two receiving stations, situated respectively at Pisa and at Leghorn, in the telegraph offices of those cities, so as to obviate the retransmission of telegrams.

The present station of Coltano and the new station will constitute another radiotelegraphic centre of the greatest importance, destined to ensure communication with North and South America.

THE TECHNICAL PROGRESS OF RADIOTELEGRAPHY IN JAPAN DURING 1919

By Dr. Wichi Torikata, Chief of Japanese Wireless Research Laboratory.

To describe briefly the recent wireless progress in Japan, it is better to divide the subject into the following five items :—

(1) Ship and shore communication.
(2) Trans-oceanic communication.

(3) Research work.
(4) Wireless Manufacturing Companies.
(5) Wireless News Agency.

(1) Ship and Shore Communication.

As a result of the late war, the serious necessity for wireless on board ship was recognised by the ship owners, and thus requirements of wireless equipment was exceedingly great during the last two or three years. There are 2,838 mercantile steamers now in Japan and

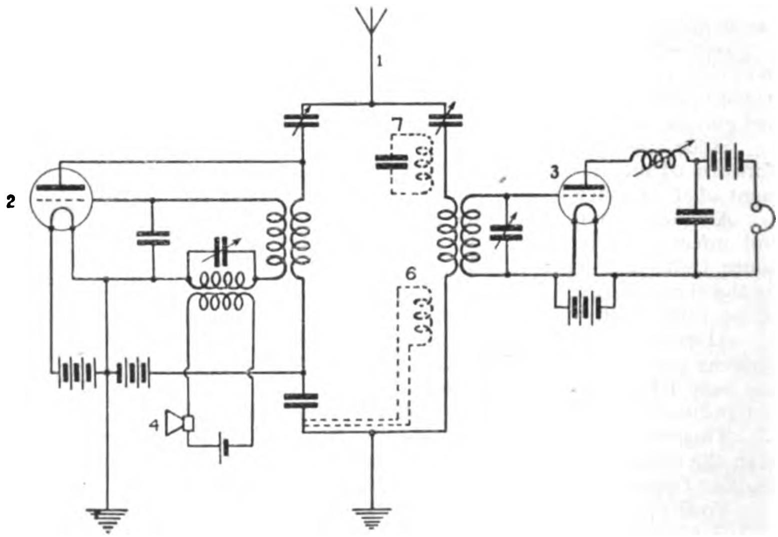


Fig. 1.

1,077 of them possess a tonnage above 500 tons; 235 ships among them have wireless equipment, 47 being Government stations and 188 private stations. There are also commercial land stations, one of them being for trans-oceanic use and the remainder for coast communication.

Generally speaking, the Government stations have not increased in number, but private stations are increasing very rapidly and thus the serious lack of radio apparatus was experienced. Japanese radio operators, especially on foreign liners, are required to speak at least the English language, and it is impossible to educate them to speak English within three or four months. Thus all shipowners experienced very great trouble, and finally gave $200,000 to the "Institute of Telegraphy" and inaugurated last year the regular education of radio operators.

(2) Trans-oceanic Communication.

Funabashi, the only commercial trans-oceanic station in Japan, belongs to the Japanese Navy, and thus time available for its commercial use is strictly limited. Funabashi communicates daily with Kafuku, the Hawaiian Marconi station.

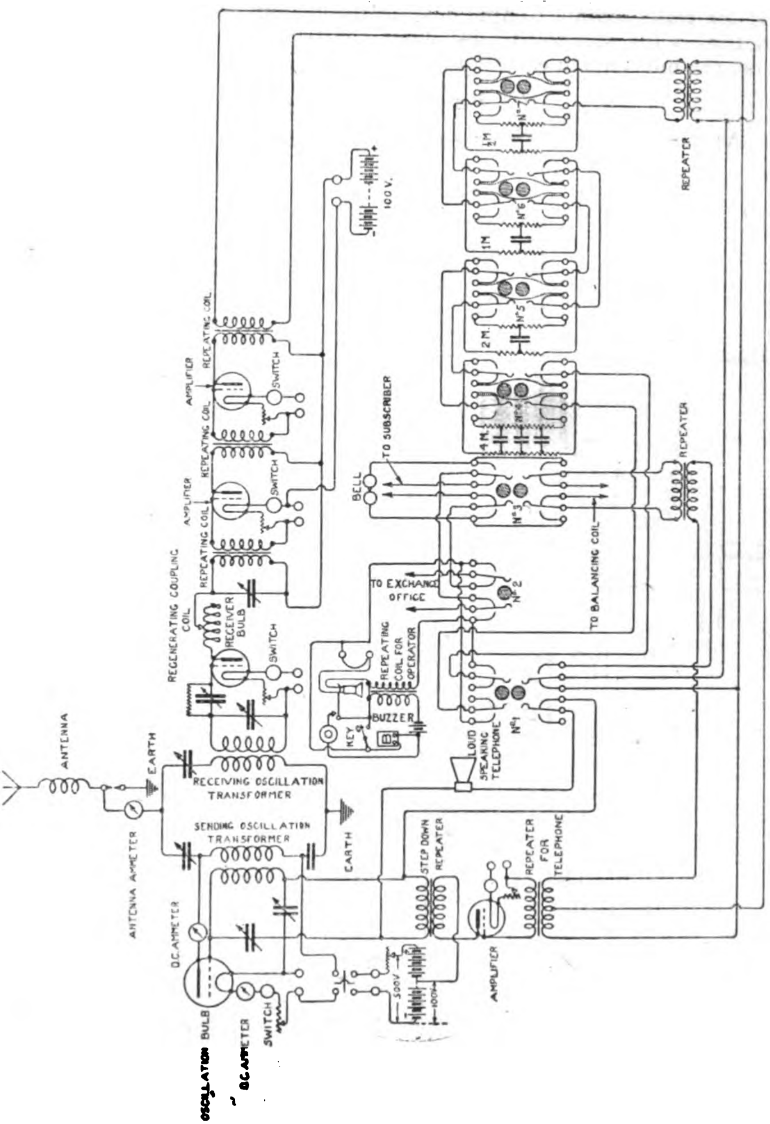

ANTENNA
EARTH
ANTENNA AMMETER
RECEIVING OSCILLATION TRANSFORMER
SENDING OSCILLATION TRANSFORMER
EARTH
D.C. AMMETER
OSCILLATION BULB
D.C. AMMETER
SWITCH
500V
100V
REGENERATING COUPLING COIL
RECEIVER BULB
SWITCH
REPEATING COIL
AMPLIFIER
SWITCH
REPEATING COIL
REPEATING COIL
AMPLIFIER
SWITCH
REPEATING COIL
100 V.
STEP DOWN REPEATER
AMPLIFIER
REPEATER FOR TELEPHONE
LOUD SPEAKING TELEPHONE
KEY
BUZZER
REPEATING COIL FOR OPERATOR
TO EXCHANGE OFFICE
BELL
TO SUBSCRIBER
TO BALANCING COIL
REPEATER
REPEATER

Fig. 2.

Very rapid increase of trans-Pacific radio communication forced the Japanese Government to establish another station which is to be used for trans-oceanic communication throughout the day and night, and thus a big station is now under construction in Harano Machi, about 180 miles north-east of Tokyo.

(3) Research Work.

As for research work, the development of the vacuum bulb has

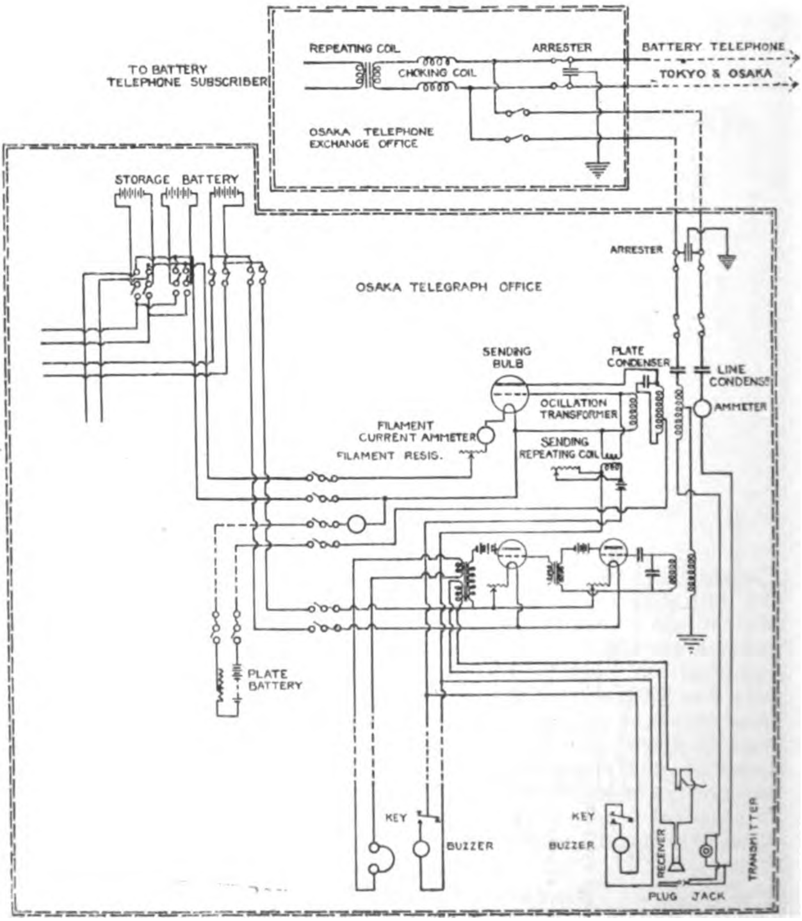


Fig. 3.

enabled simultaneous sending and receiving both for radiotelegraphy and radiotelephony to be accomplished with the same aerial, and thus sea-going ships are now able to speak directly with any land wire subscriber, wire and wireless telephony being connected in the coast switching station. Fig. I. is one example of the connection diagrams for simultaneous sending and receiving, where the same antenna (1) may be permanently connected to both the sending and receiving circuits as in the diagram. In Fig. I. (2) is the sending oscillation bulb; (3) the receiving bulb; (4) the microphone transmitter, and (5) the receiver.

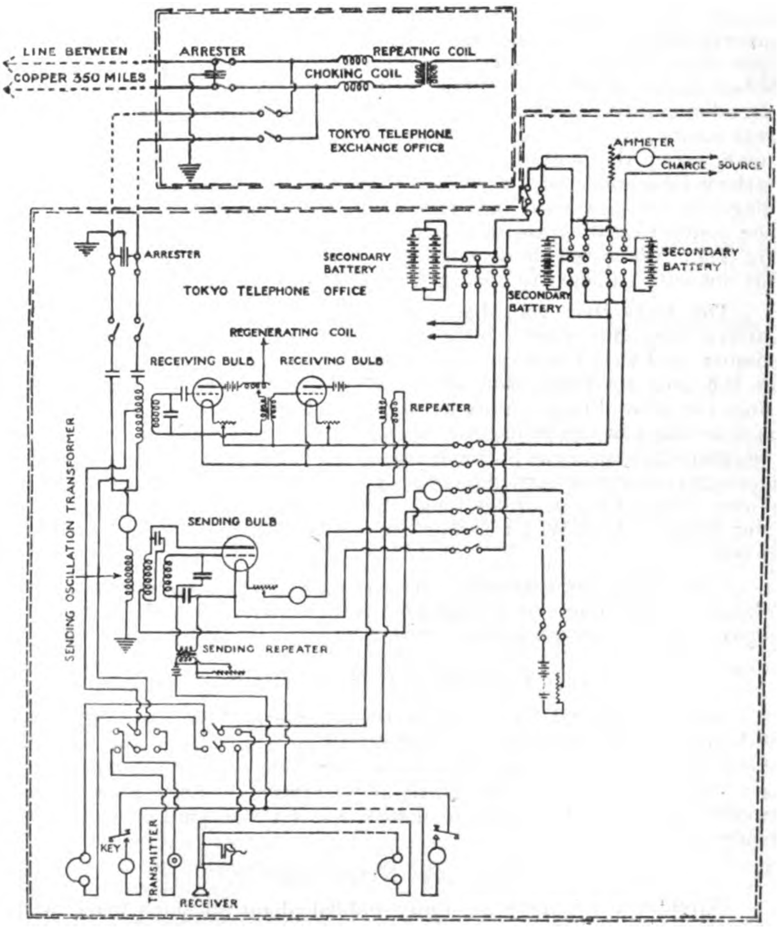


Fig. 3.

Even though the wave-length of the sending circuit is quite detuned from that of the receiver, the oscillations produced by bulb (2) may pass into the receiving circuit, and therefore coil (6) is sometimes used to balance out the effect of this shunted current, or coil (7) may also be employed. Its natural wave-length is equal to that of the sending wave, so that it absorbs the energy of this shunted current, thus eliminating the bad effect on the receiver bulb. Two different antennæ may, of course, be used instead of the same antenna (1) to minimize the effect of the sending aerial. Fig. II. forms an example of the connection diagrams for the coupling of wireless, say, from a ship with a land wire subscriber. Moreover the success in production of pure and continuous oscillation with vacuum bulbs permits of the superposition of the high-frequency wave on the telegraph and telephone lines as well as on the power transmission lines, without causing any disturbance to the line on which the wave is superposed. Thus success attended multiple-wave telegraphy and telephony by superposing waves over battery telegraph or telephone lines. A quite satisfactory experiment, using the said high-frequency telegraphy and telephony over battery telephone lines, was carried out at the end of 1917, and wave telegraphy is now used between Tokyo and Osaka, 350 miles apart. The connection diagram of the arrangement now adopted is given in Fig. III. Wave telephony between Tokyo and Osaka is also possible, but not with sufficiently good articulation for general use.

The facts that very bad troubles are generally experienced in battery telephone lines used in conjunction with electric power transmission, and that the wave superposed on the power line has no effect on the power transmission itself, while giving very loud reception (since the power line generally has very small resistance and inductance), have resulted in the utilisation of this method of wave superposing on the power line and even in the disuse of the battery telephone line itself. The experiment was carried out over the transmission lines of Kinugawa Water Power Co., 90 miles long, the voltage being 55,000, and also over those of Fuji Water Power Co., 27 miles long, the voltage being 20,000.

The results were splendid and the experimental equipments were used for some time. It is probable the method will soon be used in electric power transmission practice.

(4) Wireless Equipment Manufacturing Company.

The Oki Electric Co. do not now manufacture wireless equipment, and the only two wireless manufacturing companies are Annaka Works and Nippon Radio Co. Both have been very busy during the last year or so. Forty per cent. (40%) dividend in the former, and twenty per cent. (20%) dividend in the latter was paid to the shareholders.

(5) Wireless News Agency.

Wireless newspapers are daily published on all ships fitted with wireless while such ships are within range of Japan. The news is sent from Nippon News Agency to all liners belonging to Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha, the three biggest steamship companies in Japan.

TECHNICAL PROGRESS OF RADIOTELEGRAPHY IN NORWAY DURING THE YEAR 1919

By Commander B. L. Gottwaldt, Royal Norwegian Navy.

THE technical development of wireless in Norway is being closely followed in scientific circles because of the unusual and pronounced physical characteristics of the country. The difficulties presented in this direction are being rapidly surmounted as indicated by the progress made during 1919 and the programme of immediate developments.

During 1919 most of the coastguard stations belonging to the Telegraph Department were brought up to date in the matter of receiving apparatus. In this work extensive use has been made of three electrode valve amplifiers. To the ten coast and land stations partly belonging to the Government's Telegraph administration and partly to the Navy five important additions have been made. These are :—

Stavanger Radio, Marconi C.W. System, intended for Transatlantic correspondence with U.S.A.

Kristiania Radio, Telefunken C.W. System, intended for communicating with fixed stations abroad, and also for inland communication and Press news.

Fauske Radio, Marconi Musical Spark System, for inland communication.

Utsire Radio, Marconi Musical Spark System, for coast and ship traffic.

Bear Island Radio, Marconi Musical Spark System, erected by the Bear Island Coal Company for private communication between Bear Island and Ingey Radio (northern part of Norway).

The Norwegian Telegraph authorities and the Norwegian Navy have closely followed the recent developments in wireless telephony, and as a result are now carrying out exhaustive experiments with the wireless telephone under the special conditions applying within the country. The Telegraph Department, also alert to the great assistance which can be afforded by wireless in the rapid and cheap circulation of news to the Press, has in hand at the moment a scheme for radiating news from the Kristiania station to towns in the northern part of Norway, varying from 450 to 650 nautical miles from the transmitting station. As in this case very mountainous country has to be traversed, Marconi receivers of a specially sensitive pattern have been installed.

The authorities controlling the Lighthouse Service have also taken a keen interest in wireless during the year, and as a result have decided to erect small automatically operated wireless lighthouse stations at the entrance to the Kristiania Fjord and also outside Bergen on the western coast.

At the commencement of 1919 Norway had about 130 wireless installations on her ships; about 35 of these were installed on board warships. During the year, however, the number of wireless installations on board mercantile vessels was augmented to about 140. Nearly

75 per cent. of these ship stations are equipped with the Marconi system. The new British Merchant Shipping Act, which requires wireless installations on all ships with a gross tonnage of not less than 1,600, is certain to influence wireless activity in the Norwegian merchant fleet. It is worth while noting that this fleet already has a gross tonnage of about 2,000,000 tons, and that ships with an aggregated tonnage of one million tons are now under construction.

The Norwegian Mercantile Marine ranks fifth amongst the nations, and is approximately of the same size as that of Sweden and Denmark combined.

The Norwegian Parliament has passed a law entitling the Telegraph Administration to take over ships' wireless installation and operate them on their own account. So far nothing has been done in this direction, but it is understood that the Telegraph Department intend to apply their powers to the larger passenger steamers as soon as it is practicable.

The prospects for rapid wireless progress within Norway are bright. This progress can be greatly accelerated by the cultivation of a wider interest amongst amateurs. Much technical ability will be directed towards the practical study of wireless problems if greater encouragement is given to the amateur. Serious restrictions surround the position of wireless installations by amateurs, and the Telegraph Department will do well to cancel these restrictions at an early date and issue licences such as will place the amateurs of Norway at least on a level with those in America and the principal European countries.

On January 1st, 1919, a new Norwegian Wireless Company was formed. This company, known as the Norsk Marconikompani, has its head office in Kristiania, and has acquired the Marconi rights and patents, besides taking over all the Marconi business in Norway. The company's capital is 1,250,000 kroner, and the majority of the capital is in Norwegian hands, the principal shareholders being prominent Norwegian shipowners.

TECHNICAL PROGRESS OF RADIOTELEGRAPHY IN THE UNITED STATES DURING 1919

By Alfred N. Goldsmith, B.S., Ph.D.

(*Editor of the "Proceedings of the Institute of Radio Engineers.*")

THE ending of the war has permitted the release of a flood of information relative to inventions made during the past few years, but necessarily kept secret during the period of hostilities. While a considerable portion of these inventions and the apparatus based on them have been of specifically military nature and designed to meet military needs, many of them will have a direct usefulness in commercial radio communication as well. The following résumé of recent progress in radio communication in the United States will therefore be understood to refer to the period 1917–1919 broadly.

Radio Telegraphic Transmitters.

Considering first the high-power transmitters, the entire development has been centred on the larger Poulsen arcs, the Marconi timed spark system, and the Alexanderson alternator.

The Federal Telegraph Company has successfully produced for the United States Navy a series of arcs ranging in input from 2 to 1,000 kilowatts. Units of 250, 500, and 1,000 kilowatts have become practically standard for the high-power stations, such as those at San Diego, California; Cavite, Philippine Islands; and Annapolis, Maryland. These massive arcs, which somewhat resemble a large horizontal turbo-generator, have proved reliable generators of large quantities of radio frequency energy. In spite of the repeated efforts to overcome the drawback of the radiation of a compensation as well as a sending wave (with its resultant increase of interference and inefficient utilisation of ether paths), there has been no public description of any successful device for controlling such high-power arcs in transmission so as to radiate but a single wave, with zero or diminished energy on the same wave-length between the dots and dashes.

The great wave-changer switches of such high-power arc installations are remarkable examples of high tension and high frequency design. Rotary switch blades four or five feet long mounted on three-foot porcelain insulators and driven by electric motors, with remote control, constitute their principal features of interest. The design of antenna insulation, with proper distribution of the electric strain along a string of insulators by suitably shaped conducting end shields, has given the high-power station designing engineers further serious problems, now for the most part overcome.

The General Electric Company has prosecuted the development of the Alexanderson alternator and its associated control equipment and radiating systems with the utmost vigour during the past year. The New Brunswick station of the American Marconi Company (temporarily under naval control) has been used as an experimental and commercial station during the greater part of the war, the antenna energy being supplied by a 200-kilowatt Alexanderson alternator at about 13,200 metres wave-length (22,500 cycles per second). Suitable air core transformers connected to this alternator change the current and voltage produced by it to values suited to the antenna constants. Telegraphic transmission is accomplished by "magnetic amplifier" control. The magnetic amplifier is a ferromagnetic inductance comprised in a circuit of special design, and enables the ready control of the alternator output by relatively small amounts of energy in the control windings. The station at New Brunswick was actually controlled remotely from the Navy Department in Washington through a usual telegraph land line.

A special multiple antenna was used at the station, this consisting of a normal long horizontal antenna as used in the Marconi high-power stations, with the addition of a series of tuned down-leads, functioning as separate antennæ fed in parallel from the long horizontal conductors of the system. The inventor, Mr. Alexanderson, explains the operation of this device in general terms as that of a transmission line supplying current to a number of in-phase vertical antennæ, the fields of which add at a distant point but the ground resistances of which are paralleled and therefore considerably diminished for the entire system. It has been found by practically continuous use of the station during the past year and a half that excellent communication with Europe was possible by its use, a fact of great importance during that period of the war

when the congestion of cable traffic was extreme and there was a possibility of the cutting of the cables as well.

The timed spark station of the American Marconi Company at Marion, Massachusetts, has recently been put into experimental operation preliminary to commercial service when it is finally officially released by the Government authorities. This station is a 350-kilowatt timed spark station, intended to work on the United States–Norway circuit with the corresponding station at Stavanger. After making the necessary modifications of the antenna, ground, and equipment, it was found to operate very satisfactorily at high efficiency. It will be recalled that this type of Marconi station gives sustained radiation through what is practically impact excitation of the antenna at an extremely high spark frequency definitely related to the radio frequency of the antenna circuit.

The lower power spark sets show a general trend toward the use of impact excitation. The simplicity of operation of sets of this type, so far as tuning is concerned, has recently led a number of the American manufacturers to adopt this type of set for commercial service. Thus, both Cutting and Washington and the American Marconi Company furnish sets of this type. Essentially these sets comprise primary circuits of very high decrement fed with high voltage alternating current of appropriate wave form, and provided with a gap of high intrinsic quenching. The primary is closely coupled to the secondary, and it is found that the secondary tuning to the primary under these conditions is not critical but broad. Nevertheless, the antenna radiation is of the same natural damping as the antenna circuit. Among the earlier American users of these sets may also be mentioned Messrs. de Forest, Simpson, Ellery Stone, and Roy Thompson.

There has been comparatively little further development recently on commercial quenched spark sets, these having reached the practical limit of their development with the present types of circuits prior to the war. However, a number of small and portable quenched spark sets provided with audio-frequency alternating current obtained from a " buzzer transformer " were developed for military purposes. This interesting combination of a buzzer for breaking direct current, say, 500 times per second, and also transforming it to the high voltage necessary for gap breakdown by means of a secondary winding over the usual buzzer winding, has attracted some attention from the American Marconi Company and from Mr. E. J. Simon. By appropriate circuit design, sparking at the buzzer contacts has been practically eliminated. A very compact and reliable type of set has resulted from the efforts of the companies mentioned.

An unusually efficient and widely useful type of spark set intended primarily for airplane use has been built by the International Radio Telegraph Company in fractional kilowatt sizes for the army and navy. It contains a rotary synchronous spark gap with interchangeable rotors having different numbers of teeth. Thus various notes can be obtained by changing the rotors. The airfan-driven generator is at once an alternator and its own direct current field exciter. The entire set has been enclosed in a stream-line casing to diminish air drag in flight. Used on the " NC " flying boats on the first America-to-

Europe flight, it has shown itself capable of communication from the plane to land over distances of from 700 to 1,400 miles.

Radio Receivers.

Receiver development has unquestionably centred recently on the amplifier. Numerous types of vacuum tube amplifiers for either audio or radio frequency amplification have been developed. Some of these have been of the resistance coupled type, others of the transformer coupled type. The complicated problems involved in the design and utilisation of these amplifiers, particularly for very high amplification and for short-wave working, have been to a considerable degree worked out. The influence of the amplifier has probably been most marked in connection with trans-oceanic reception, where its introduction has certainly enabled the use of smaller receiving antennæ.

Trans-oceanic reception will necessarily be high-speed, and this obvious trend has led to the development of a number of forms of high-speed recorders. Prominent among these may be mentioned the photographic recorder of the General Electric Company. In this device the message is received on a rapidly moving photographically sensitive tape, being produced by the light beam reflected from a vibrating mirror mounted on a tuned vibrating element actuated by the incoming signals. The advantage of audio frequency tuning and selectivity is thus added to the recorder. Reception at 500 words per minute has proved possible with this device. Other forms of high-speed receivers involving the dictaphone and the telegraphone have also been used, particularly by the American Marconi Company.

In an attempt to simplify the operation of normal ship receiving sets, Mr. R. E. Thompson has devised a uni-control (or single control handle) receiver. In this receiver, the primary (antenna) inductance and series condenser are periodically varied either by motor drive or by hand. The aperiodic secondary is simultaneously varied appropriately both as to coupling and self-inductance. It is claimed that such equipment makes possible a more thorough and complete watch on board ship, since it requires less concentrated attention and continuous effort on the part of the operator; and also that it enables the more rapid location of signals on unknown wave-lengths.

Vacuum Tubes.

The development of receiving and transmitting bulbs has been very rapid. The de Forest Company, General Electric Company, Marconi Company, Moorhead Laboratories and the Western Electric Company have all produced various useful types of bulbs. Practically all these bulbs, even for reception, are distinguished by the use of a high vacuum. The Western Electric Company remains the sole user of the oxide-coated platinum type of bulb, most of the manufacturers adhering to tungsten for the filament and nickel, molybdenum, or tungsten for the grid and plate. The Marconi Company has specialised particularly on a tube due to Mr. R. A. Weagant employing an external "shield" in place of the internal grid for the control of the plate-to-filament current. Highly successful results have been obtained with such tubes both for reception and transmission. A bulb having an external plate and internal filament and grid has been produced by

Mr. Donle, the plate current passing from the filament across the vacuum and through the heated glass container by actual conduction to the plate. This device is claimed to give good results in reception and amplification.

Static Elimination.

A wide variety of circuits for the elimination of static have been described by their inventors recently. The urgent need for reliable radio communication during the war provided a powerful stimulus to those having plans for the elimination of that ancient enemy of radio communication, static. Mr. R. A. Weagant, of the American Marconi Company, has carried out an elaborate series of experiments which have led to special antenna forms and associated receiving circuits of remarkable stray-reducing characteristics. This work has yielded noteworthy results when reception reliability on this system is contrasted with that obtained, for example, on the plain antenna, using the statistical method of comparison. Lieutenant-Commander A. H. Taylor, of the American Navy, has also originated circuits intended for the same purpose, and generally employing subterranean or submarine antennæ. Excellent results are claimed for these as well. Among the other inventors who have shown results of value are Dr. Austin, Mr. E. F. W. Alexanderson (whose " barrage receiver " of high directional selectivity has been widely used). Mr. Greenleaf W. Pickard, and Messrs. James C. Rogers and W. E. Woods. At this time, there has been made no definite classification of the methods proposed by the various inventors ; and it is evident that this unusually complex subject will require further consideration to establish fully the relation of the devices used by each of the workers to those employed by the others.

Duplex Communication.

As the more elementary problems of the radio art have been met and mastered, it is natural that the refinements and improvements of more complex nature should attract increased attention. Thus it is that duplex communication, or simultaneous transmission *and* reception, has received wide consideration recently. It is clear that the capability of " breaking " the transmitting station at any time without ceasing reception has advantages. So far as radio telephony is concerned, high-grade service in this field in the future can only be duplex.

The United States Navy has investigated a number of methods of duplex working based on various bridge arrangements in which the transmitting and receiving equipments occupy conjugate or mutually non-influential branches. It has also investigated the possibility of neutralisation of " balancing " methods. Considerable success has been achieved in this direction. The General Electric Company has largely concentrated its efforts in this direction on a capacitive bridge arrangement and claims no difficulty in trans-oceanic reception while several kilowatts are being radiated in the immediate vicinity (undamped radiation). It is evident, however, even from the data now available, that the problem is a more difficult one for damped than for sustained wave working.

Radio Telephony.

High-power radio telephony has been altogether carried out with the alternator stations recently. The high-power arc stations have not

shown themselves susceptible of the extremely flexible and accurate output control required for radio telephony. On the other hand, using the magnetic amplifier controlled by vacuum tube amplified telephone currents between 50 and 100 kilowatts have been successfully modulated at the New Brunswick station, thus establishing what is probably a world's record for the amount of energy controlled accurately by the human voice. The voice of the Secretary of the Navy was sent to President Wilson on his return from France; the words spoken in Washington, sent over the wire line to New Brunswick, and relayed by radio to the President's ship, being actually received in Brest Harbour, or completely across the Atlantic. While trans-Atlantic radio telephony was previously achieved by the Western Electric Company with a bulb equipment at Arlington, this later transmission is unquestionably a far closer approach to commercial standards. It is interesting in this connection to recall the transmission during several hours of the day of radio telephone messages from Ireland to Canada by the English Marconi Company. Clearly radio telephony over long distance looms up as one of the most promising developments of the near future.

The United States Signal Corps has been closely associated with the development of numerous types of low-power radiophone sets. These were mainly constructed by the Western Electric Company. They are generally distinguished by the use of the usual "tapped-centre inductive coupling oscillator" with plate circuit modulation of the absorption type, and with an amplifier bank of tubes raising the modulated radio frequency energy generated by the master oscillator to the value desired for the antenna circuit. The de Forest Company has produced numerous airplane radiophone sets as well, along somewhat different lines, particularly as to the modulation system.

Antenna Forms.

In addition to the forms of antennæ which have been worked out primarily for static elimination, there have been developed various forms of underground and underwater linear and loop antennæ. Mr. H. H. Rogers has carried out extensive experiments on such submarine and subterranean antennæ, and has shown that they constitute effective receiving antennæ, and fair transmitting antennæ, if not buried too deeply. Lieutenant-Commander A. Hoyt Taylor has carried out extensive quantitative researches on these antennæ, and has ascertained the conditions under which they operate most effectively. The resulting information has been given wide practical application by the Navy, and particularly in connection with static reduction and duplex operation of stations.

Another form of antenna which has engaged wide attention is the loop or coil antenna. The directional characteristics of this antenna and its compactness have made it a desirable device for portable military sets. It is also widely used for radio compass or direction-finding work commercially by the United States Navy. The chief objections to the loop have turned out to be the rather extreme amplification required for good signals (particularly if the loop is small and the received wave-length a long one), and the necessity of keeping the loop away from large conducting masses if the direction readings are to be of accurate nature. The Signal Corps has experimented widely

with many types of loop, both on the ground and in the air, with marked success. Work on loops has also been carried out in a quantitative way at the Bureau of Standards.

Combinations of loops and vertical antennæ have been applied to unilateral direction finding—that is, not only finding the line on which the unknown station lies, but also the sense along the line. Such devices are proving useful in connection with the elimination of interference. There has been much valuable work done by the American Marconi Company on receiving from very distant stations while near-by powerful stations were working, utilising the "blind spot" of the unilateral direction finder.

Airplane Communication.

In conjunction with the Signal Corps, the Western Electric Company has developed numerous types of airplane radio telegraph and radio telephone bulb sets. Most of these sets were intended for fire control, and had a comparatively short range. The receivers provided with them were usually furnished with several step amplifiers, and the bulb plate circuits fed from direct current generators provided with suitable filter circuits across the generator to eliminate the noise caused by commutator ripple.

The Navy Department, in conjunction with the Marconi Company, the General Electric Company, the Western Electric Company, and the de Forest Company, has developed a very complete series of low and moderate power bulb radiophone sets. The first of the longer range radiophone seaplane sets was built and designed by the Marconi Company, and successful communication was established from the flying boat to Washington over a distance of 65 miles. The set in question was provided with a special balanced circuit ensuring oscillation under all conditions, this having been one of the most positively required specifications to be met. A later series of sets of various sizes built by the General Electric Company met a series of specifications of wide range in wave-length and power. A land station radiophone set, to work with airplanes, was also built by the General Electric, this set being arranged for reliable communication with airplanes over fairly considerable distances.

The aerial mail service of the Post Office Department has been carrying on experiments in radio telephony, particularly in connection with directional reception for night landing and for the location of airplanes in flight. It seems clear that thoroughly reliable airplane mail service must have as an adjunct reliable communication at all times between the plane and ground, together with radio location of the plane.

The results obtained so far by the Department have not been made public, but are said to be extremely promising.

Radio Compass and Beacon Stations.

The development of the loop receiver had made possible the erection of radio compass stations whereby ships at sea can, at any time, obtain their location from two of the receiving loop stations on land, the usual process of triangulation being used by one of the land stations or by a third control office to obtain the exact position of the calling ship. The Navy has erected a great number of such compass stations

along the coast, and the resulting advantages to navigation, particularly in fog or storm, seem to indicate this as an application of radio to be adopted and standardised by all leading nations.

Some little experimental work has also been carried on with radio beacon stations, these being transmitting stations (generally automatically controlled), which send out at regular intervals warning radio telegraph or radiophone signals, preferably the latter. By sending out sets of signals of successively feebler intensity and increasingly urgent import, a series of graded warnings becomes available. Thus the loudest signal might be: "You are approaching X Reef." This would be heard at the maximum distance. The next feebler signal might be: "You are getting closer to X Reef. Keep off." The third and feeblest might be: "You are directly off X Reef and in great danger. Keep to sea at once." Indeed, the responsible branches of the Government charged with aids to navigation and safety of life at sea are experimenting with many radio devices intended to secure the desired results.

Radio Legislation.

During the war all radio communication in the United States was under the absolute control of the Navy. Commercial stations were not in operation, and experimental research was conducted only under proper though severe restrictions. On October 1st, 1919, the radio amateurs were again permitted to send and receive, being put, as before, under the jurisdiction of the Department of Commerce as the licensing and regulating power. The value of the amateur as a source of skilled personnel in times of emergency having been recognised, it is likely that amateur radio work in the United States will flourish and be encouraged.

There have, however, at various times been introduced into Congress laws providing for Government ownership in one form or another of coastal or long distance commercial stations or both. These Bills have in each case designated the Navy as the Government Department to be entrusted with the actual control and operation of the stations. A measure under consideration by Congress would permit the Navy to engage in commercial coastal traffic, while leaving to commercial interests the handling of long-distance radio service. Under the proposed law, the regulation of radio communication in the United States would be entrusted to a Radio Commission made up of representatives of the Government Departments interested. No definite action has been taken by Congress on this important matter up to the time of writing, and it is not known whether such action will be shortly taken or not.

While there are some divergencies of opinion, the general judgment among radio engineers, radio amateurs, and users of radio seems to be distinctly favourable to the control by private agencies of commercial communication rather than its administration by a Department of the Government. It is to be hoped that, whatever action is taken in the matter, it will be of a tentative nature and based on the theory that the control of commercial radio communication should be entrusted only to those who demonstrably render efficient, speedy, and courteous service such as may conduce to the rapid growth and ever-increasing usefulness of this valuable means of communication.

THE PROGRESS OF WIRELESS TELEPHONY

By W. T. Ditcham, A.M.I.E.E., M.Inst.R.E.

THE progress of wireless telephony during the past year has been more in the nature of an increased utilisation of systems and methods already known than in the inception of new ideas of prime importance.

No new method of generating continuous oscillations has been devised, and at present the high-frequency alternator and the thermionic valve are the only two continuous wave producers employed to any extent as wireless telephone transmitters. For short and medium ranges and for wave lengths below about three thousand metres the valve is undoubtedly the most effective generator known, but on longer waves the alternator can deal with far greater powers than any practical arrangement employing valves that has so far been attempted.

The rivalry between the exponents of these two systems of generation is very keen, and at the present time it is difficult to forecast which of the two methods will finally prove superior in the field of high-power telephony. On the surface it would certainly appear that the valve offers more scope for invention and development than the longer known machine, and if methods can be devised for increasing the life of, or perhaps finding a substitute for, the present filamentary cathode, the narrow wave length variation of the machine will prove a heavy handicap in the fight for supremacy.

The alternator lends itself well to control of output by detuning, and at New Brunswick, N.J., the combination of the Alexanderson high-frequency machine and the voice operated magnetic amplifier has resulted in remarkable distances being obtained. Speech from New Brunswick has been received on board the s.s. *George Washington* while lying in Brest harbour, a distance of about 3,100 miles. Reports from Louisburg, Nova Scotia, state that the speech from this station is of wonderfully good quality. It was from this station also that the Secretary of the United States Navy spoke to President Wilson during the latter's voyages between America and Europe.

As Alexanderson's magnetic amplifier might equally well be used to modulate the output from any other type of high-frequency machine, such as the Goldschmidt reflection alternator or the Telefunken alternator and frequency multiplier, one feels justified in stating that the technical problems of simplex wireless telephony over two or three thousand miles have been successfully solved for such wave lengths as this type of generator can produce.

Undoubtedly at the present time all but an almost negligible proportion of wireless telephone sets rely upon the valve as the oscillation producer, and it is the development of this type of transmitter that engages the attention of the majority of workers in wireless telephony.

Most of the valve telephone sets at present manufactured for sale are of comparatively small power, ranging generally from some fifty watts to about two kilowatts in power input. As, however, with modern receiving apparatus, such a transmitter as the latter permits of reliable communication over two or three hundred miles, it will be

seen that the present normally attainable telephonic range is about the same as was the usual ship telegraph range before the advent of amplifying detectors.

The valve telephone record set up by the Western Electric Company in 1915, when, by means of some five hundred valves, nine kilowatts of high-frequency energy was generated and modulated in the Arlington aerial and speech transmitted to Paris and Hawaii, remains unbeaten, but is hardly likely to remain so much longer. The existing high-power valve transmitters of the Marconi Company, manufactured in commercial form, are capable of delivering to the aerial considerably more energy than was obtained in the above-mentioned experiments, and these transmitters will undoubtedly be used for telephonic purposes when a suitable occasion offers, probably before these lines reach print. At least one long-range valve telephone test has been made during the past year, namely in the spring of 1919, when the Marconi Company carried out experiments between Ballybunion, Ireland, and Louisburg, Nova Scotia (see *The Wireless World*, June, 1919). In these tests a valve oscillator of about two and a half kilowatts power input was used, and speech was successfully transmitted across the Atlantic to Louisburg, about eighteen hundred miles distant. Other good distances covered by valve telephone transmitters have been between Chelmsford and Ballybunion, Aberdeen, Berwick, and Amsterdam. The two latter distances were obtained with sets of half a kilowatt input.

That such ranges as those above mentioned can be obtained with the energies employed is due primarily to the marvellous sensitiveness of the valve amplifiers used for reception, and secondly to the fact that the output from the valve can be more deeply modulated by an ordinary microphone than was possible in the days when some form of arc or high-frequency spark was the only short wave generator available.

The application of wireless telephony to aircraft has been extensive and successful. Large numbers of machines, both military and commercial, have been fitted, and the practice will probably become universal. Extreme lightness, compactness and reliability is essential in apparatus for such use, and in this field the valve transmitter is without a rival. The power, both for anode and filament current, in these aircraft sets is usually supplied from a direct current double commutator dynamo driven by a small wind propeller and mounted in the slip stream of the main propeller. As in motor-car lighting plant, some arrangement has to be provided for keeping the dynamo voltage approximately constant over a wide range of speed variation. A particularly neat solution of this problem has been developed in the United States in the following manner :—In series with the main field winding of the dynamo is connected the filament of a low-resistance Fleming valve, the plate filament circuit of which is in series with an extra field winding on the machine, wound so as to oppose the main field. At the lowest speed of the dynamo the filament brilliancy is such that little or no current flows in the differential winding. If, however, the speed of the generator increases, the Fleming valve filament brightens and more current flows through the plate circuit, and consequently through the differential winding, thus weakening the field and keeping the voltage from rising above a certain fixed value.

The power of aeroplane telephone sets does not as a rule exceed one hundred watts, but even this allows of reliable working over very

useful distances. The Royal Air Force instals a forty watt set, which gives ·3 amperes in a one hundred and fifty foot aerial at 450 metres, and gives communication between aeroplanes up to thirty miles, or between aeroplane and ground up to sixty miles. Another R.A.F. set of seventy-five watts, working with an aerial current of ·6 amperes at 1,400 metres has telephoned nearly two hundred miles. The British airship R.34 was fitted with a telephone installation on her voyage across the Atlantic and reported telephonic transmission at a range of eighty miles. For communication from the ground to aircraft more power is required to cover a given distance than in the reverse direction, owing to the engine and wind noises on the machine, which necessitate strong signals in the head telephones, but the R.A.F. ground stations of a power of 250 watts obtain ranges to machines in the air up to ninety miles.

The oscillating valve in its present stage of development is essentially a high voltage small current instrument. The methods available for producing the required high voltage direct current are several. Even for very small power sets a battery is seldom employed, as it is uneconomical both in cost and in space required. These little transmitters are frequently equipped with a hand-driven permanent magnet dynamo giving a thousand volts or so. A less exhausting system suitable for a short range portable set is to make use of a small spark coil with a high speed break as the source of high potential. The interrupted pulses produced by the coil are rectified by a vacuum tube of the Lodge valve type and fed into a condenser of half a microfarad or so in capacity, which acts as a reservoir of high-tension direct current for the oscillating valve. With a sufficiently high speed break in the primary of the spark coil, speech of very fair quality can be transmitted. Such a set is very convenient for short distance continuous wave work, as one battery suffices to light the oscillator filament and energise the spark coil primary. A Fleming valve can, of course, be used as a rectifier, but in this case a separate and well-insulated battery has to be provided for lighting the filament of the rectifier, and this may present difficulties in a portable set.

Direct current dynamos for voltages up to about 1,500 are obtainable without much trouble and are frequently used for small power telephone transmitters, but machines to generate much higher potentials require very special design and have not been available to any extent in this country hitherto. However, very high voltage direct current generators are now in course of manufacture, and, if sufficiently reliable, will probably become standard practice in valve transmission work. At the time of writing, the usual practice for all powers above, say, 200 watts, is to utilise an alternating current machine with step-up transformer, rectifiers and smoothing condenser as the source of anode potential. The frequency of the alternator is preferably not less than about 150 cycles, and may with advantage be anything higher. Telephony from a transmitter of this type provided with a suitable arrangement of condensers and choke coils for smoothing out the alternator ripple is indistinguishable at the receiving station from speech sent from a transmitter energised by a direct current machine. It is usual in valve sets of this type to light the filament of the oscillators and rectifiers from the same alternator that supplies the power, suitable step-down transformers being included for the purpose.

One great advantage of valve transmitters of this type is that the power plant required is the same as that of an ordinary spark station, so that the conversion of existing spark wireless stations to valve transmission usually involves no expense for new generating machinery. Again, a station may be equipped for both continuous wave and spark transmission with only the one power plant to actuate either type of sender.

There are two methods of producing oscillations in an aerial for telephonic purposes by means of three-electrode valves, and these may be classified either as "direct drive" or "independent drive," according to whether the oscillations generated by reaction between the grid and plate circuits of the power valve are transferred to the aerial directly, or whether the oscillations are first impressed upon the grid of a non-reacting valve acting as a magnifier and then transferred to the aerial. The former method is that usually employed in this country and Europe generally. A direct drive transmitter may be connected so that the coupling to the aerial is either conductive or inductive. The wireless telephone sets manufactured in England have mostly made use of auto-coupling, as the circuits required are simple, the method is efficient, and a change of transmitted wave length is easily made, one adjustment usually being all that is necessary. However, if freedom from radiated harmonics is desired, and this will be a point of importance in future high-power stations, whether valve, arc, or machine, it will doubtless be imperative to use some form of indirect coupling, even if that implies a decrease in efficiency. The independent drive or master oscillator system, although due to H. J. Round in England, has been principally developed in the United States. It was this type of transmitter which was used in the Arlington tests, and the method has been quite commonly employed in American sets of medium power. There are two main variations of the independent drive method, one in which the voice modulations are applied to the master oscillator directly, and the other in which the oscillator output is not controlled, but instead the oscillator is coupled to a modulator valve, on which the voice variations are impressed, intervening between the oscillator and the magnifying valve, whose office is to increase the amplitude of the voice modulated oscillations and then transfer them to the aerial.

The underlying reason for the independent drive lies in the fact that as the oscillating energy in the first instance need be only a small proportion of the final power required, the modulation by the voice becomes a much simpler proposition than controlling the total output, as must be done if the direct drive system is employed. In fact it cannot be said that the problem of controlling a high-power valve transmitter by the voice in a simple and satisfactory manner has been altogether solved. For small powers the control presents no difficulty whatever. The methods commonly used at the present time fall either under the heading of grid voltage control or anode voltage control, although many variations of these two have been suggested and are possible. With the exception of energy control by insertion of a microphone in the aerial, which we will not consider here, as the application is obviously very limited, the simplest method is undoubtedly to vary the voltage of the grid of the oscillating valve by a battery operated microphone and step-up transformer, the secondary of which is inserted in the grid circuit.

It has frequently been stated that such a control system is undesirable, on the ground that if more than a narrow range of voltage variation is impressed on the grid, the valve is liable to stop oscillating, with the result that the transmitted speech is broken. As a matter of fact, with suitably designed valves and circuits and with correct adjustment of reaction this method is remarkable effective on short wave lengths, say below one thousand metres, in conjunction with receivers of low damping. To obtain a sufficiently deep modulation it is not essential to impose on the grid voltage variations great enough to break the oscillations.

The effect of varying the grid potential of an oscillating valve in a direct coupled transmitter appears to be rather to alter the transmitted wave length than the transmitted energy. In consequence of this wave change effect a reaction valve receiver adjusted almost to the point of self oscillation is markedly effective with a direct coupled transmitter controlled in this manner. Obviously if this method is used with a loosely coupled tuned circuit the result will be a radiated energy control. A variation of the method which has been recently used by Lee De Forest in some of his telephone sets consists in using a three-electrode valve as the resistance in the grid circuit of the oscillator and varying this resistance by speaking on the grid of the extra valve. Another modification lately suggested by the Société Française Radio Électrique is to shunt the reaction coil of the oscillating valve by a parallel inductance-capacity circuit or rejector, in one leg of which is placed a microphone. On long waves the grid control method becomes inefficient, and it is usual in these circumstances to use the second arrangement about to be described. The second method of modulation, namely by control of the anode voltage, is usually accomplished by shunting the oscillating valve by another valve, placed preferably in such a position in the circuit that high-frequency currents do not pass through it, and impressing the voice-produced potentials on its grid, frequently after magnification by a primary control valve.

If one sings a sustained note into the microphone of this type of transmitter it will be noticed that the aerial current falls considerably, whilst a similar action in the case of a grid-controlled direct-coupled transmitter produces no perceptible effect, provided the reaction is properly adjusted. This second method of control acts therefore more by variation of transmitted energy than by alteration of wave length, and will give stronger signals on an ordinary rectifier or non-reacting receiver than the grid-controlled transmitter. Also there is no noticeable falling off in control efficiency as the wave length is increased. The standard aircraft sets of the R.A.F. are modulated in this manner. It may be noted in passing that the effectiveness of both the above described methods of control is greatly increased by the insertion of a high-inductance choke coil, generally referred to as the "speaking choke," in the anode circuit.

The question of control becomes more complicated when large powers have to be dealt with. As long wave lengths are usually employed for long range working, in order to reduce the absorption, the grid control becomes ineffective, as previously stated. If on the other hand the control is accomplished by variation of anode voltage, it is found that the control valves require to be capable of dealing with at

least as much energy loss as the oscillating valves, and this factor results in somewhat cumbersome and complicated apparatus where a high-power transmitter is concerned. A similar disadvantage exists if the control valves are placed in shunt to the aerial inductance in an inductively coupled transmitter.

At the moment it would appear that the independent drive system is the best available solution, but even this method tends to rather complicated circuits. What is required is a low-resistance valve of heavy current carrying capacity, which could be used in an absorption circuit acting on an inductively coupled transmitter. An attempt to produce such an instrument has been made recently by I. Langmuir, who describes a mercury vapour arc with a control electrode for use as a modulator.

The apparatus of a wireless telephone installation normally has to include some form of switch to change over from the position of receiving to the position of transmitting, and thus differs from land line telephone circuits, which permit of both speaking and listening simultaneously. The change-over switch is usually operated manually, either directly or by magnetic means, although various devices have been patented for effecting the switching by the voice produced currents. Obviously, a duplex arrangement is a great advantage where a telephonic conversation is concerned, and becomes practically imperative if wireless speech is to be relayed to and from the existing land line telephone exchanges, a development that will have to materialise if the full possibilities of wireless telephony are to be realised.

A distinct advance in this direction has been made by E. F. W. Alexanderson of the General Electric Company of America (see Proc. I.R.E., Aug. 1919).

Alexanderson makes use of two separate aerials, one for transmitting, the other for receiving, which may be supported from the same mast or mast system, and provides means for nullifying the effect of the transmitting aerial on the receiver. Two methods of accomplishing this result are described. The preferred arrangement, termed a "Bridge Receiver," consists in connecting a point on the receiving aerial, situated between the primary tuning inductance and a series condenser, to a point on the transmitting aerial above the aerial tuning inductance through a variable capacity, known as the "exposure condenser." By correct adjustment of this exposure condenser a potential created by the transmitter can be impressed upon the receiving primary of such a sign and value as to neutralise the potential induced on the receiving aerial by the nearby transmitting aerial. The receiving primary inductance is statically shielded and coupled aperiodically to the secondary. The alternative method acts by inductive neutralisation, a point on the receiving aerial above the primary inductance being connected through an exposure condenser to a transformer in the transmitting circuit so connected as to impress on the receiving aerial a potential opposite in phase to that induced by the transmitting aerial directly. The value of the neutralising potential can be adjusted by the exposure condenser so that the receiving aerial has only a comparatively small residual voltage left on it, and this is finally weeded out by a rejector circuit.

Alexanderson has cited some results which go to prove the practical value of these devices. Duplex telephony has been demonstrated

over a range of fifty miles, and it has been found possible to receive signals from stations two thousand five hundred miles distant while the nearby transmitting aerial was oscillating with a current of twenty amperes. It is not stated, however, what difference in wave length between transmitter and receiver was found necessary to achieve such results. Various arrangements having a similar object in view have been tested by the United States Navy, the most promising results apparently being obtained by simply coupling the secondary circuit of the receiver to the transmitter in such a manner that the voltages induced thereby are equal and opposite to the voltages produced by the transmitting aerial on the receiving aerial and thence impressed on the receiver secondary. To secure working conditions with this circuit it was found necessary for the shorter of the wave lengths used to be not more than fifty per cent. of the longer.

In the paper above mentioned, Alexanderson also describes a method for enabling speech to be relayed both ways over a single land line such as is used in ordinary telephone practice. This arrangement consists in connecting the land line circuit to the modulator of the wireless transmitter and inserting in the same circuit the secondary of a transformer whose primary is connected to the detector of the wireless receiver, suitable amplifiers being provided at both transmitter and receiver. In this manner the land line circuit, the wireless transmitter and the wireless receiver are all equivalently in series. It is interesting to note that as the received signals affect equally the land line circuit and the wireless transmitter circuit, the received speech is relayed out again by the transmitter, which therefore sends out both sides of the conversation.

Clearly this method is available with any system of duplexing that may be devised, either with the near-by balanced aerial type, above described, or with methods relying upon directional aerials or distant out-of-tune aerials for the non-interference effects, and is a definite step forward towards the perfecting of commercial wireless telephony.

There is one marked defect which is common to all the usual forms of modern wireless telephone transmitters, and that is the continuous radiation produced during the whole period in which the apparatus is in the transmitting condition. The principle on which all these present-day transmitters operate is that of radiating a continuous wave train and varying this either in amplitude or in wave length by the voice. This principle is open to serious objections on the score of increased interference with other æther circuits and the great waste of power so occasioned; also the difficulties of duplexing are enhanced. In this particular point the art has actually retrograded since the days of the very first wireless telephone transmitters, which merely consisted of a high voltage transformer, with some form of spark gap to energise the aerial connected in its secondary, and a microphone and battery in its primary, so that radiation took place only at the moments when the microphone resistance was varying. Although these crude transmitters were not capable of reproducing speech of good quality, even with a mercury vapour or other high spark frequency gap, undoubtedly the principle on which they are intended to operate was correct.

A number of suggestions have been made since the advent of valve telephony with a view to eliminating this defect, but for the most part

the circuits suggested appear to be too complicated and difficult of adjustment for practical application. One feasible method, applicable to certain wave lengths, to which the above objections would not apply and due to J. Carson, of the Western Electric Company of America, embodies a small high-frequency alternator, the field excitation of which is varied at speech frequencies by amplified microphone currents acting on the field through a transformer, the alternator output being afterwards amplified by valves and transferred to the aerial. A more recent patent of the Western Electric Company (Brit. Pat. 130219 of 1918) discloses an arrangement of a master oscillator inducing on to the grids of two modulating valves whose plate circuits are coupled to an aerial, or battery of amplifying valves, in such a manner that normally the effects oppose one another and no transference of energy occurs. The grids of the modulating valves are also connected to opposite ends of the secondary of a microphone transformer, with the result that speech currents from the microphone affect the grids in an opposite sense and throw the neutralised couplings in the plate circuits out of balance, thus causing radiation to take place.

At one period during the development of wireless telephony the attention of investigators was devoted almost exclusively to the production of a microphone capable of carrying heavy currents without overheating, and the transmission ranges obtained depended largely upon to what extent this difficulty had been overcome. A periodical record of the progress of the art in those days could consist of little more than a description of the different microphonic arrangements devised by various workers with a view to increased energy capacity. At the present time one hears practically nothing of improvements in microphones. This is due to the fact that the standard line instrument easily deals with the energy required to modulate a valve transmitter of quite considerable power, and in cases of greater energy being necessary, as for example in the operation of a high-power magnetic amplifier, the primary microphone output can without difficulty be magnified many times by suitable valve circuits.

In connection with telephone sets for use in aircraft a good deal of attention has perforce been given to methods of mounting the microphone to prevent engine and wind noises from affecting the diaphragm and overpowering the voice waves. The best solution up to the present appears to be a microphone adapted for binding on to the throat and operated by movements of the throat muscles during speech, an arrangement which allows practically no exterior noise at all to reach the diaphragm.

As regards receivers for wireless telephony there is nothing particularly distinctive to chronicle. A large amplification is usually made use of, and generally the best results are given by high-frequency cascade amplifiers.

As to the practical value of a perfected system of wireless telephony there can be no question, but before deciding whether or not the science has yet reached a stage of general utility, the matter has to be considered from more than one point of view. The different types of service to which wireless telephony may be put appear to the writer to fall naturally under two main heads, namely :—

(1) For private purposes.
(2) For general public use.

Under the first heading comes the application to aircraft, naval and military uses, and the substitution for wireless telegraphy in countries where the language is of such a character as to be unsuitable for transmission by the morse code (*e.g.*, China), or in cases where the amount of traffic to be dealt with would not warrant the expense of maintaining skilled telegraphists.

The second type of service comprises the use of wireless telephony in place of line telephony where the latter would be impossible or disadvantageous, such as telephonic communication between ships and land, between moving trains and fixed points, transoceanic and particularly transatlantic communication, and the linking up of settlements in sparsely populated countries.

The fundamental difference between these two classes is that in the first the operators of the apparatus are, or can be, persons trained in the reception of wireless speech under average conditions, that is reception through a certain amount of interference and atmospheric disturbances, while in the second class the immense majority of users must be those entirely without experience of wireless working, in which case, unless the received speech can be heard free from any extraneous noises, the conversation will be unintelligible to the layman, and the whole idea will be condemned as unpractical. Wireless telephony, from the point of view we are now considering, consequently presents a more difficult problem than has ever confronted wireless telegraphy (of the hand transmission aural reception type), for in this the skill of highly trained and expert telegraphists is always available for combatting the difficulties of interference. Obviously, this advantage has to be sacrificed in telephony of the second class, because the only reason for telephony of this type as opposed to telegraphy lies in direct personal communication, and, as previously stated, the possibility of this, so far as the general public is concerned, is closely bound up with the attainment of extremely effective interference prevention.

Fortunately, the recent work of C. S. Franklin, R. Weagant, and E. F. W. Alexanderson, among others, has led to very considerable improvement in this respect, while other promising lines of investigation are now being proceeded with, so that one may reasonably predict that by the time public wireless telephony is definitely called for it will be possible to adequately supply the need.

In concluding this review of recent progress it may be of interest to place on record a description of a wireless telephone set manufactured in considerable numbers by Marconi's Wireless Telephone Company for portable use, and which may be looked upon as typical of a simple form of medium power telephone station of the present date.

The primary power is provided by a two-and-three-quarter horse power petrol engine driving a self-exciting alternator, which delivers half a kilowatt at eighty volts and one hundred and eighty cycles. The primary voltage is transformed up to about five thousand volts and rectified by a single Fleming valve, half wave rectification being employed for the sake of compactness. The rectified pulses of high-tension current are used to charge a mica condenser of a quarter micro-farad capacity, connected between the filament of the rectifier and the earth end of the transformer secondary. This condenser is constructed in two halves and has an iron core inductance inserted between the two portions for the purpose of smoothing out the alternating current

ripple. Another iron core inductance is connected to the positive terminal of the condenser, and the high-tension current is then led through a high-frequency choking coil to the anode of the power valve, which, when oscillating, shows a feed current of about fifty milliamperes.

The valve filaments are lighted by alternating current from a step-down transformer having one primary and two secondary windings, the secondary for the rectifier filament being insulated for the high potential of the smoothing condenser. Each filament takes six amperes at about ten volts.

The transmitter is of the direct-coupled type, the aerial inductance being connected in shunt to the anode and filament of the power valve, and consequently a blocking condenser is placed between the anode and the top of the aerial inductance to prevent short circuiting of the high-tension current.

Regenerative action is set up by mutual induction between the aerial inductance and a reaction coil mounted inside it and connected to the grid of the power valve at one end and to the filament, through a small condenser, at the other. Across this condenser is shunted the secondary of a step-up transformer in the primary of which is placed a microphone and six volt battery. The control therefore is by means of variation of the grid voltage.

The standard aerial consists of a single horizontal wire with down lead in the centre, and is supported by two masts, thirty feet high, placed about two hundred and twenty feet apart.

Earth connection is made by copper gauze nets laid on the ground, and with this arrangement the normal aerial current is of the order of three amperes.

The set is designed to transmit on a wave length of eight hundred metres, but a variometer in the aerial inductance allows of a variation of some fifty metres on either side of this mean. The receiver may be used either directly or inductively coupled to the aerial, and as provision is made for reaction, it is suitable for either damped or undamped wave reception.

The amplifier consists of three high-frequency valves connected in cascade through transformers having a blunt resonance point at eight hundred metres, and a final rectifying valve, all the filaments being operated from a six volt battery, and the anodes from a thirty volt battery.

A multiple contact hand operated switch is used for putting the apparatus into the transmitting or receiving condition as required.

Tonic train telegraphy may be carried on by replacing the microphone with a high note buzzer and manipulating key.

Continuous wave telegraphy is also provided for, the manipulating key in this case being arranged to break simultaneously the primary power circuit and the grid circuit of the oscillating valve.

The set has thus a varied range of use, and in practice has been found extremely reliable and " fool-proof." Very good distances have been covered by these small stations, and on occasion clear speech has been interchanged over a range of two hundred and sixty miles across land.

Such sets as these are interesting as being the forerunners of many others of similar type, which in the near future will render wireless telephony one of the commonplaces of everyday commercial life.

VALVE AMPLIFIERS FOR SHIPBOARD USE

By F. P. Swann.

DURING the war the development of the three-electrode valve was so rapid, and such enormous quantities were urgently required, that it was seldom possible to give the requisite time to the considerations that commercial economy necessitates. Immediately the Armistice was signed, however, the designing staff began to consider with regard to valve and valve amplifier design the application of all the lessons learnt during the war. The design of a suitable ship amplifier received immediate attention, and it is the object of this article to explain the considerations which led to the adoption of the present design of this amplifier.

During the war the two factors which gave the greatest concern were (1) the life of the valve; (2) the maintenance of its high and low tension batteries. The maintenance of batteries in the field is, of course, a far greater problem than on a land or ship station, and similarly the mechanical shocks that the valves are subjected to in the field are much greater than those on a ship or a fixed land station. The chief object in reducing the battery maintenance to a minimum, and in obtaining the maximum length of life of both valve and battery is, from a commercial point of view, one of expense; and from a war point of view, portability and the reduction of man power required in manufacture, and subsequent transport in the field.

If the valve filament be made of tungsten, to obtain a required emission either the filament diameter can be kept small and maintained at a high temperature, or the diameter can be made larger and run at a lower temperature. As the emission, however, goes up according to an exponential law with regard to the temperature, and a straight line law with regard to the surface, this latter method becomes a very wasteful one from a filament current point of view. There are two advantages, however, possessed by the larger diameter filament which are:

(1) Mechanical strength.
(2) Long life owing to the lower temperature at which it is being run.

Under conditions where battery maintenance is a simple matter the large diameter filament would be the correct design, providing the initial cost of the battery was not prohibitive. In order to meet the requirements of the American Army, the Western Electric Co. of America produced a coated filament which gave the requisite emission at a very low temperature, and the filament did not take more than 0·5 watts in order to make the valve fully operative. The disadvantage, however, of a coated filament in a valve is that it is a very difficult type to pump. The metal for the anode and supports, therefore, has to be very carefully cleaned and rendered as gas free as possible before the

valve is assembled; and if, when the valve is in operation, the anode becomes unduly hot, then almost invariably the valve becomes soft—*i.e.*, the vacuum becomes low. The research work, therefore, being undertaken to-day, is to discover a filament which will give a good emission at a low temperature, and yet will permit of simple pumping methods. The production of such a valve would reduce the filament battery to the capacity of dry or primary cells. All the undesirable features of accumulators and those attendant upon the charging of same would disappear, and new fields for the use of the valve would thereby be produced.

Taking now the question of the high tension or anode battery, there are probably relatively few of the readers of this article who have experienced the troubles attendant upon the upkeep of a 200-400 volt dry cell battery, but most must have a thorough knowledge of the vagaries of a pocket flash lamp battery. If these are multiplied by one hundred, then the troubles in the early days with the batteries for each " C " type valve will be appreciated. In considering the design of a valve for ship use, therefore, perhaps the outstanding feature kept in view was the absolute necessity for an anode battery having a low voltage. Unfortunately, however, as the resistance of the valve is reduced in order to make it operative on a lower voltage, the voltage magnification of the valve drops also, and if a definite amplifier voltage magnification is to be retained, then more of the low voltage valves in cascade will be required. The most economical compromise between the anode voltage and the number of valves had therefore to be determined. The determination of this compromise was not so straightforward as it would seem, as other considerations of reception rendered the question very much more complex. Perhaps at this point it would be advisable to consider some of these general problems in reception, having regard in particular to those of ship reception.

The immediate requirements of a ship amplifier were, of course, reception on spark on 300, 600, and 2,800 metres. The longer wave length being that of Poldhu when sending out the press programme. The possibility however could not be overlooked of there being at least a certain number of ships which would have to be able to receive on continuous waves. The trend of future development had to be very carefully borne in mind in order that the amplifier would not become out of date in the event of continuous waves or other alterations coming into extensive use. The following information and experience was gained during the war, and had a distinct influence on the design of the amplifier. At several of the receiving stations that were in operation during the war there were quite a large number of aerials each with its circuit, all of which were operating at once. The ranges of wavelength over which each set was operating were, of course, different, but there was of necessity a certain overlap. These aerials were relatively very close together, in some cases there being several on the same mast. It was necessary that these circuits should not interfere with one another, and the tendency for them to do so was for the most part dependent on the type of circuit in use. The simple reaction circuit shown in Fig 1 was one that was used very largely at the beginning of the war. As will be seen from the diagram, if the coupling between the aerial and the anode circuit is sufficiently strong, then these circuits will

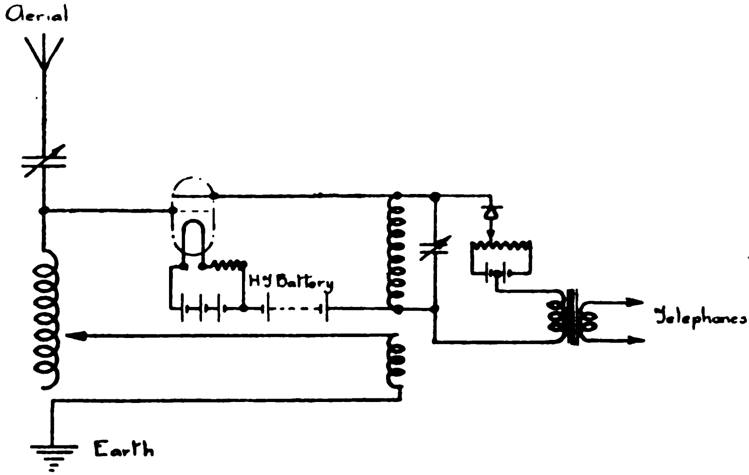


Fig. 1

be able to maintain themselves in a continuously oscillating condition. When receiving spark signals the strength of this coupling is so adjusted that the set is almost on the point of going into continuous oscillations, for maximum sensitiveness is thereby attained. Should the coupling be strengthened beyond this point, then a " howl " is heard in the telephones, and the set is then in a self-oscillating condition. Energy therefore is being radiated from the aerial, and if any nearby aerial is tuned to the same wave-length this " howl " will be heard. It is impossible, therefore, for two such circuits whose aerials are close to one another to work on the same wave-length without seriously interfering with one another. This is owing to the fact that the usual method of adjusting the reaction coil was to tighten the coupling until the " howl " was heard, and then weaken the coupling until the " howl " just stopped. All such self-oscillating circuits containing only one valve have this very serious drawback. If, therefore, such a circuit were fitted on a ship, when two or more ships were close together, serious interference between themselves would be produced. It was considered that this circuit would be sensitive enough for all ship requirements, but owing to this possibility of interference when several ships were close to one another, an adjustment for reaction was ruled out. Having, therefore, eliminated the magnification due to reaction, it became obvious that more than one valve would be required in order to obtain a magnification of a practical value. It was, of course, very desirable that the number of valves on the amplifier should be as few as possible, and therefore the use of two valves only was the first arrangement that was considered. The following arrangements are possible with two valves and a crystal :—

(1) One valve used for magnifying the high frequency current, and the other as a rectifier.

(2) One valve used as a rectifier, and the other for magnifying the rectified signals.

3) Two valves arranged to magnify in two stages the rectified signals, the crystal being used as the rectifier.

(4) Two valves arranged in cascade to magnify the high frequency current, the crystal being used as the rectifier.

(5) One valve used for magnifying the high frequency current, the crystal as a rectifier, and the other valve magnifying the rectified signals.

From the characteristic curve of a crystal, it will be seen that the efficiency of rectification of strong signals is much greater than that of weak signals. In order, therefore, to increase the range of reception, it is much more effective to magnify the signals before rectification than after. Unfortunately the great trouble with high-frequency amplification is its inflexibility. By this is meant that the wave length range is limited over which the amplifier will magnify efficiently. It is impossible to construct an intervalve transformer having a low resistance winding which will give good sensitiveness over a wide range, and an arrangement having a number of transformers each for a particular range becomes very much too clumsy from a mechanical switching point of view.

The value of a valve as a rectifier is not apparent at first sight, but nevertheless it has some very valuable properties. When rectifying only, the sensitiveness of the valve is no greater than that of a crystal, but, on the other hand, it is absolutely stable. This cannot be said of a crystal, for a very strong signal or a bad atmospheric will put it out of adjustment, and it is a very difficult matter to prevent the sensitive point being burnt out when the ship is transmitting. In spite of the tremendous value of the stability of the valve, this advantage on its own merits might not have warranted the inclusion of a valve in the set for rectification only. There is, however, a much greater advantage which the valve possesses and that is that it renders possible the elimination of jamming and the mitigation of interference from atmospherics. In order to obtain these effects, the operation may be described as follows :—By means of a variable resistance in series with the filament of the rectifying valve, the brilliancy of the filament is dulled down below that of the normal value. If by means of a potentiometer the potential of the grid of this valve be moved along the grid volt-anode current curve, then it will be found that there is one point on the curve at which any particular signal vanishes. At this point the increase in current due to the positive half of the wave is equal to the decrease in current due to the negative half of the wave and therefore nothing is heard in the 'phone. On each side of this point, however, the signal is heard, owing to the fact that the current change for each half of the wave is then no longer equal. It will now be found that this point is not in the same position on the curve for all signals, even when they are on the same wave-length. Therefore when two stations are sending on the same wave-length, it is now possible to eliminate the one which it is not desired to hear. Atmospherics, unfortunately, do not balance out in quite the same manner, but they may be reduced to a strength comparable with that of the signal, so that reading through them becomes possible.

The operation of dulling down the filament brilliancy, while making it possible to balance out signals, unfortunately at the same time decreases the strength of all signals, so that when the balancing feature is in operation, the magnification of the set is considerably below that when the brilliancy is normal. The standard of magnification it was desired to retain under all conditions was of an arbitrary value, but it was considered that arrangements (1) and (2) did not give a magnification which from experience was considered to be necessary.

Arrangement (3) has features, some of which are for and some which are against its adoption, and these we will now proceed to discuss.

The greater sensitiveness of the crystal over the magnetic detector had brought about the displacement of the latter in favour of the former in the majority of ship stations, and in the case of nearly all land stations. With the termination of the war, the problem had to be faced of bringing ship and land stations up to date in the light of the most recent valve amplifier practice. From the point of view of economy it was, of course, essential that the amount of new gear should be a minimum, and that the maximum use should be made of the gear already installed. It is here that the designer was faced with a very awkward problem. The magnetic detector wants current for its operation, whereas the crystal requires volts. In consequence the circuits of the multiple tuner are designed with large condensers and small inductances, whereas those of the crystal tuner have large inductances and small condensers. The valve is a voltage-operated device, and, therefore, while it could be used in conjunction with a crystal tuner, its use with the multiple tuner would be productive of no results of any practical value. Fortunately the majority of the tuners in use were of the crystal type, but there were a sufficiently large number of multiple tuners and magnetic detectors on existing stations to make the modernisation of these stations a very serious problem.

The approximate range of the crystal and multiple tuners is from 300-3,000 metres. As has been stated before, high frequency amplification is by no means flexible, and to design an amplifier to give good amplification over such a range would be a very difficult matter, and would render the cost absolutely prohibitive. It is here that the insidious voice of the note magnifier is heard, " magnify after rectification." The advantages of the note magnifier are very prominent and very appealing. No alteration to existing gear is required, it can be applied to the crystal tuner and multiple tuner alike. The difficulties of the wave-length range is overcome, for it is equally sensitive on all wave-lengths. The number of valves required would be only two. There are no adjustments. It must be admitted that to wipe off such a formidable list of advantages is no simple matter.

When rectifying by means of a valve or crystal, the strength of the rectified signal is proportional to the square of the incoming signal. Low frequency magnification after rectification is directly proportional to the strength of the rectified signals. The result in the telephones therefore from the combination of a note magnifier and a crystal is that the weak incoming signals are of medium strength, and strong incoming signals are intolerably strong. During the absence of atmospherics and jamming the arrangement is quite good, but when either one or both troubles are present in strength, then readability drops to

zero. To those not acquainted with the actual working conditions on a ship it may appear that the troubles from jamming can be easily over-emphasised. It must be stated here, however, that such is not the case, and that from this cause alone the major portion of an operator's difficulties appear. This, then, is one strong point against low-frequency or note magnification.

When a magnetic detector is running, a faint hissing sound is heard which is generally known as "breathing." After note magnification this becomes quite a loud sound, and may compare only too favourably with a weak signal.

Again, on a ship there are stray fields due to the ship's dynamos, etc., and these tend to get into the transformers of the note magnifier. The amount of induction varies from ship to ship, but whereas before magnification it may be only an unpleasant undertone, after magnification it becomes an appalling roar. At the same time, mechanical vibrations in the ship transmitted to the valves cause noises in the telephones, and produce loud local jamming. These are further strong points against low-frequency magnification, and particularly against any attempt to use two low-frequency valves in cascade.

Yet another strong point against low-frequency magnification after a crystal rectifier is the fact that the instability of the crystal still remains.

So great did the above disadvantages appear, that the design of an amplifier on the following lines was proceeded with.

The two advantages of using a valve as a rectifier—namely, (1) stability, and (2) elimination of jamming—seemed far too great for the idea to be turned down on the score of initial expense and subsequent maintenance, so that it was decided to embody in the design a valve as the rectifier instead of a crystal. Neglecting arrangement (3) for the moment, this cuts out arrangements (4) and (5). If the radius of reception were to be increased, owing to the square law property of the rectifier, it was obvious that a high-frequency magnification was essential. Arrangement (1) was thus arrived at, but it was found that, when the interference adjustments were in use, the magnification obtained was not sufficient to enable reading to be done without a silence cabin. It was therefore decided to add a third valve which magnified signals after rectification. As the amplifier was able to eliminate jamming when such jamming occurred, the addition of a low-frequency amplification was a justifiable step. With the three valves functioning as described above, it was found that the total magnification was now sufficient even when the amplifier was in its most insensitive condition—that is, when the interference prevention adjustments were in use.

For ship work, the maintenance of a separate anode battery would be a very expensive item. Every ship has a 24-volt emergency battery, and as the total anode current for the amplifier would not exceed three milliamperes, it was decided to use this battery as the anode battery. This, therefore, was the determining factor as to the type of valve to be used, and that point being settled, the design of the amplifier was roceeded with.

Although the ship crystal tuner can tune to any wave-length between 300 and 3,000 metres, there are only three wave-lengths on which it is ever necessary to receive, namely, 300, 600, and 2,800 metres. In order to make the amplifier as simple as possible, therefore, it was decided to provide two high frequency transformers, one to cover the two short wave-lengths and the other the longer wave-lengths. The transformer for the short wave was designed to give maximum sensitiveness on 600 metres and a somewhat reduced sensitiveness on 300 metres. The transformer for the long wave was designed to cover wave-lengths

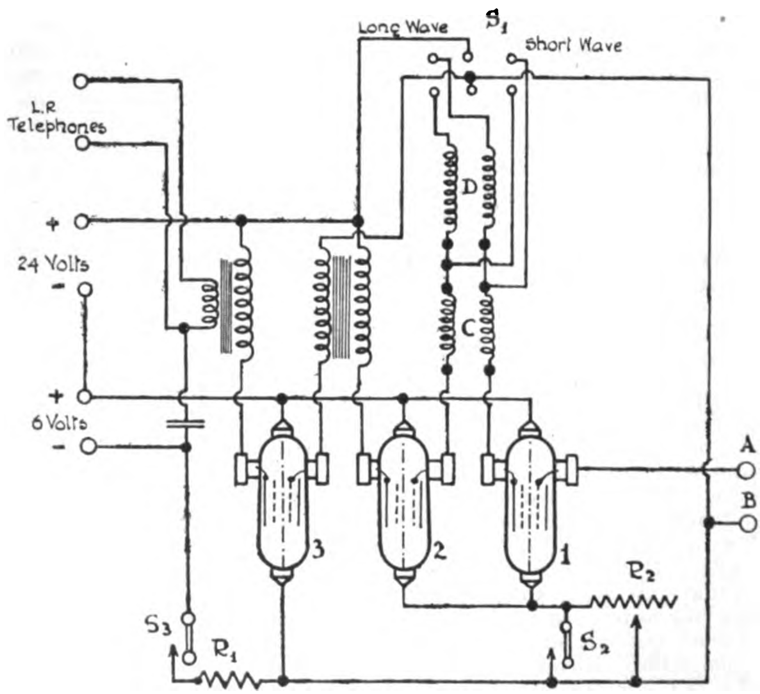


Fig. 2

from 2,000-4,000 metres, for it is between these limits that the press news is sent out on, and it is also between them that it was proposed that the wave-lengths for continuous wave working should fall when such working came about.

The above amplifier with its stable rectifier removes all the troubles produced by the instability of the crystal, and, by the addition of one adjustment only, permits of the elimination of jamming, whereas the note magnifier, if anything, tends to increase the trouble from jamming. Taking also into account the increase in the radius of reception, the advantages of such an amplifier seemed to the designing staff so over-

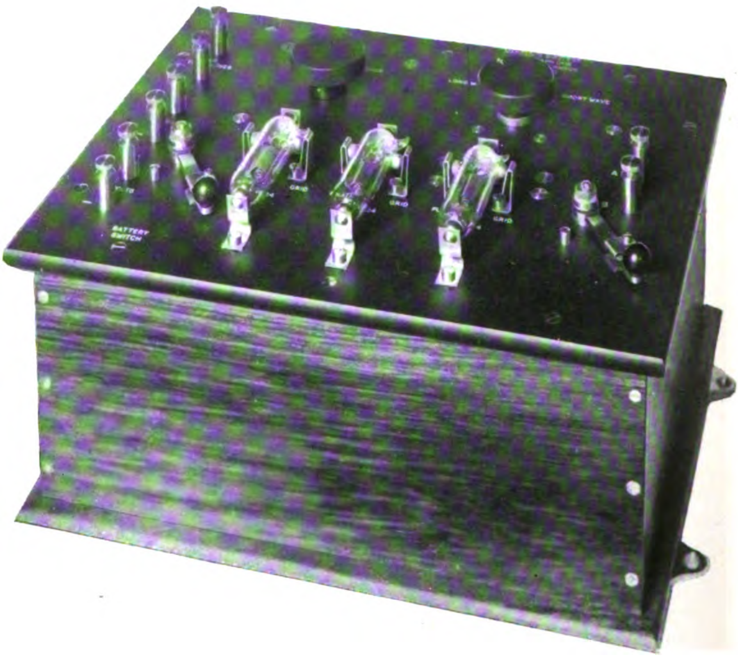


FIG. 3.

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whelming, that the use of a cascade low-frequency amplifier was definitely abandoned. The initial cost of three valves and the maintenance of same is a very large item, and one that requires a great deal of deliberation before the venture is embarked on. The technical advantages of such an amplifier are so overwhelming that it would seem that they cannot but justify the capital outlay.

Fig. 2 shows a diagram of the connections of the amplifier. "C" is the air core transformer for the short waves, and "D" is that for the long. It will be noted that for the long wave adjustment the windings of both transformers are in series. This simplifies the switching arrangements, and does not affect the operation of the amplifier in any way. Valve No. 1 is the valve which is magnifying the high frequency current, and valve No. 2 is the rectifying valve. Valves Nos. 2 and 3 are inter-connected by means of an iron core transformer, and valve No. 3, therefore, magnifies the rectified signals. The final or telephone transformer also has an iron core, and can be wound to be used in conjunction with high resistance or low resistance telephones, according to the type it is intended to use with the set. Experience has shown that low resistance telephones are much more reliable than the high resistance type, and for this reason it was decided to wind the transformers for low resistance telephones.

In the previous description of the balancing out of signals that can be obtained on the rectifying valve, the potential of the grid of that valve is described as being altered by means of a potentiometer connected across the 6-volt filament battery. It was found, however, that the same effect could be produced by means of the much simpler arrangement, and this is shown by the diagram of connections. The grid windings of the transformers "C" and "D," instead of being connected to the slider of a potentiometer, are connected to the negative end of the filament. The filaments of valves Nos. 1 and 2 are connected in parallel, and in series with them is placed a variable resistance. The action of dulling down the filaments of these two valves by means of this resistance is productive of the same effects as those described when the potential of the grid was being altered. For a certain value of filament brilliancy the signal vanishes, and is heard again on each side of this value. For different signals the value of this brilliancy to give the zero point alters, so that the elimination of jamming is attained exactly as before. This variable resistance is shown by R2 on the diagram, and it will be seen that it is provided with a switch across it in order that it may be short circuited. This enables a rapid change over to be made from the adjustment for the balance point to that for normal reception, without having to rotate the resistance back to nought each time. The resistance R1 is fixed, and the value is such that when the switch S2 is closed, the valve filaments are running at their normal brilliancy. It will be seen, therefore, that when the amplifier is in operation no adjustments are necessary except when it is desired to cut out a jamming station or reduce the strength of signals. Even then the adjustment is only the rotation of one handle. This feature requires no skilled knowledge, and with a few minutes' practice the full results may be obtained. Fig. 3 shows the outside view of the amplifier. Fig. 4 shows the general arrangement on a ship when the amplifier is connected to a Type 31A crystal receiver.

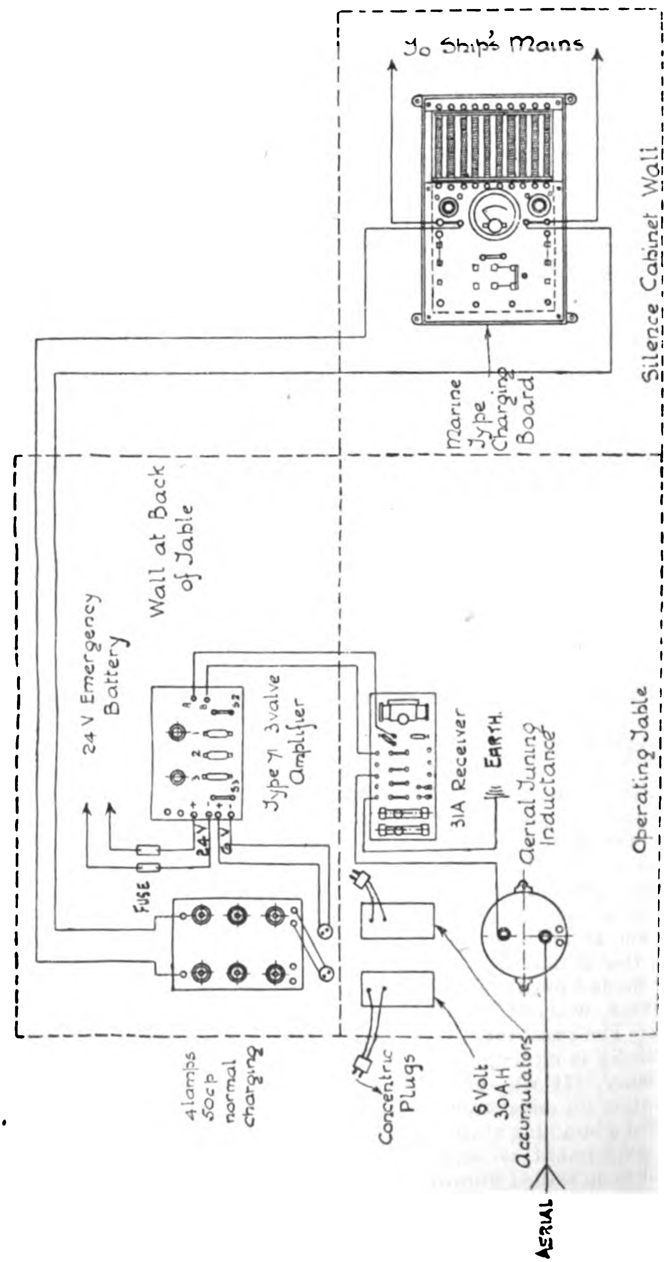

To Ship's Mains
Silence Cabinet Wall
Marine Type Charging Board
Wall at Back of Table
24 V Emergency Battery
Type 71 3 valve Amplifier
24V
6V
FUSE
31A Receiver
EARTH
Aerial Tuning Inductance
Operating Table
4 lamps 50cp normal charging
Concentric Plugs
6 Volt 30 A.H. accumulators
AERIAL

Fig. 4

CONTINUOUS WAVE RECEPTION.

So sharp is the tuning necessary for the reception of continuous waves, that this is perhaps one of the biggest difficulties to be faced. Fig 5 shows the simplest circuit that it is possible to use, but it has several serious drawbacks. The first one is that it is a plain aerial circuit, and the trouble from jamming is consequently severe. The second one, and perhaps the worst, is the strength of the heterodyne current required in the aerial. This means that energy is being radiated, and that every nearby station will be seriously interfered with. In the previous part of this article very marked attention was drawn

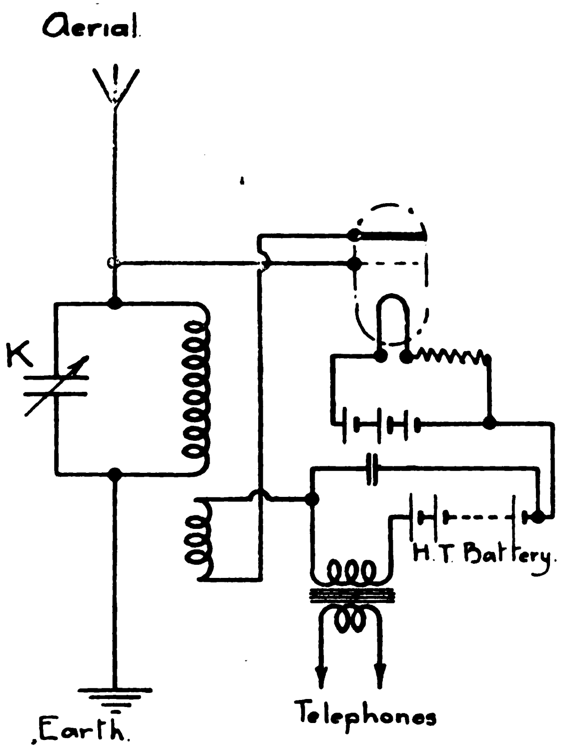


Fig. 5

to the most undesirable nature of this feature. The great advantage of such a circuit is the fact that there is only one adjustment for tuning, and that is the condenser ' K." Over the range of wave-length given by the top and bottom value of this condenser the tuning is perfectly smooth and continuous, and any continuous wave station sending within that range and within the radius of reception must be intercepted, providing that the condenser is being slowly rotated continuously from a minimum to a maximum value, and vice versa.

When designing a new tuner the provision of a reaction coil for the self heterodyne arrangement is a relatively simple matter. The case is completely reversed, however, when adapting the existing designs of crystal tuners, and the difficulties would have caused the abandonment of the idea even if it had possessed considerable advantages, which it did not. It was decided, therefore, to adopt the use of an independent heterodyne set.

One very valuable feature of the amplifier which is mentioned here for the first time is that, owing to the inclusion of a high frequency amplification, the amount of heterodyne current for continuous wave reception is now very much reduced, and when receiving on continuous waves ships may now get quite close to one another without interfering with one another in any way.

In order to avoid the trouble from jamming which is inherent in the plain aerial circuit (Fig. 5) it was decided that coupled circuits must be used. Owing to the great difficulties and expense of adapting existing tuners to work on the self heterodyne arrangement, an independent heterodyne set was the only solution. Another strong

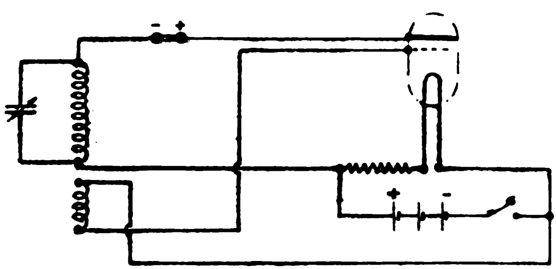


Fig. 6

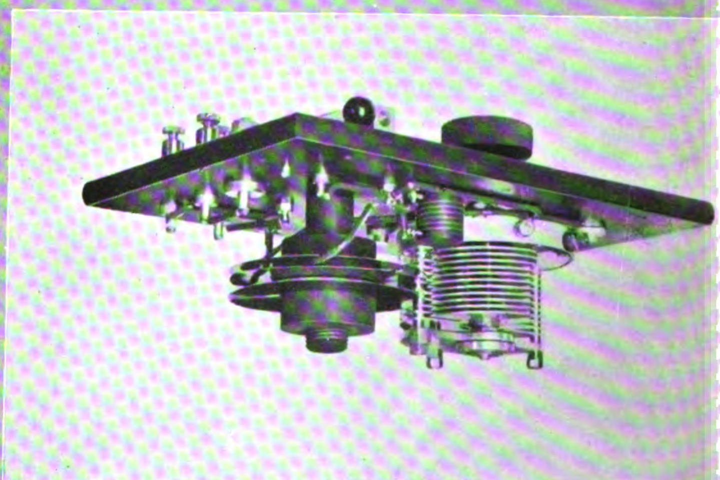
point in favour of this arrangement is that one thereby avoids certain "wipe out" effects which are given by the self heterodyne arrangement.

Another feature of the independent heterodyne set is that it permits of the use of the balance for jamming elimination, whereas with a self-oscillating circuit this would not have been possible, owing to the action dulling down the high frequency valve filament, and thereby preventing the set reacting.

The necessity for a separate piece of gear for the reception of continuous waves does not sound by any means economical. It must be remembered, however, that for some time to come the ships fitted for continuous wave reception will be very much in the minority, and that it is more economical to make a special provision in cases where it is needed than to include in the amplifier a fitting which would only be used by a small percentage of the ships thus installed.

Fig. 6 shows a diagram of the connections of the independent heterodyne set as finally designed, and its simplicity speaks for itself. There is no high tension or anode battery, there is only one valve, and the filament battery for this may be the same one as that used for the





ABOVE—FIG. 7.

BELOW—FIG. 8.

[*To face page* 935

amplifier. Figs. 7 and 8 show the outside and inside views of the ebonite panel. Two terminals " H.T." have been included and these are normally shorted. Should, however, stronger heterodyne currents be required than those given by the set, then a small battery or even the 24-volt emergency battery may be connected to these terminals, and the set will then oscillate strongly.

When it is desired to receive on continuous waves, the adjustments of the tuner are set to those for the wave-length of the transmitting station. The " billi " of the tuner and the condenser of the heterodyne set are then adjusted until an interference note is heard between the heterodyne current and that of the sending station. The aerial should then be finally tuned, and the beat note adjusted to give the greatest readability. The independent heterodyne set can then be shifted about until the signal is the loudest, and it may then be screwed to the bench.

WIRELESS TELEPHONY AND ITS APPLICATION TO AIRCRAFT

By MAJOR C. E. PRINCE, O.B.E.

IN general, the subject of Wireless Telephony may be said to be a combination of two others—namely, telephony as understood by the ordinary line engineer, and wireless proper.

Telephony is modulation by the voice of electric currents and the subsequent reconverting of these currents into sound. In spite of many attempts to use other properties of a circuit, we may consider that the only practical method is the one which has survived, of modulating currents by means of changes of resistance, and the reproduction of the sound by an iron diaphragm magnetically operated. In the field of wireless other possibilities are offered by the variation of such factors as capacity; but the best method of first applying the sound and finally reproducing it, remains the same as in line working.

Now consider what it is that has to be modulated in wireless telephony. In this case it is not a smooth continuous current, but an alternating current. Fortunately, all ordinary radio frequencies are far above speech frequency and consequently the alternations are not telephonically discontinuous, and radio frequency fails to produce an audible sound partly because of the inertia of the telephone diaphragm, and partly because, in any case, it is above the limit of the human ear. Wireless telephony transmission, then, consists essentially in the radiation of a stream of electro-magnetic waves of such very high frequency that it can be considered as perfectly uniform and continuous, whilst superimposed on this stream is a far slower variation in intensity, whose outline is that of the sounds applied, just as they are applied to a direct current in line telephony.

But in the beginning of wireless the only known methods of producing oscillations gave merely short bursts or trains of high frequency oscillations succeeding each other at comparatively long intervals of time. In order to bring this home to the imagination, it is extremely instructive to draw on a long sheet of paper damped trains of oscillations, of which the time of the radio frequency is taken at, say, one millimetre, and the next train comes at its proper distance on the time-scale. It will also be realised, by an inspection of this diagram, for what long periods of time no energy is being radiated from the transmitter to the receiver.

Thus, though the radio frequency, as such, presented no telephonic difficulties, the discontinuities were of an order which prohibited speech modulations from being conveyed on them. The limits between which some kind of speech can be produced are rather surprising at both ends of the scale. Nearly articulate speech can be transmitted on the damped wave trains produced by a very high toned buzzer, and on the other hand the fine edge of articulation can be spoilt by the interference of a note which is not quite audible to the ear. The latter was well shown in an experiment devised by the author, in which wireless telephony was

transmitted from a valve circuit which was simultaneously made to give a musical note by means of appropriate values of the grid condenser and resistance.

Thus though bad speech can be carried on very far down the scale, so to speak, good speech needs high perfection, that is to say, freedom from discontinuity, in the current modulated.

The gramophone offers a good analogy for these effects. The surface of the smooth wax may represent a continuous current or radio frequency upon which the slow sound modulations are superimposed, while the roughnesses of the surface, which spoil the reproduction, and produce the scratching noise, are equivalent to discontinuities or irregularities which come within audible limits. The earliest attempts at Wireless Telephony were naturally made with discontinuous methods, in which the aim of the inventor was to push the frequency of the discontinuities above audibility. By what we have already seen, success was only partial. It was difficult to get the frequency high enough, and good results were only obtained when this was so great as to approach to nearly continuous oscillation. Successful wireless telephony awaited the introduction of a means of producing continuous waves. The first definite production of such continuous radiation was by means of the Poulsen Arc, that is, an arc between copper and carbon electrodes burning in hydrogen, the poles of which were shunted by a circuit having capacity and inductance, which is urged by the action of the arc to oscillate continuously at the natural frequency determined by its constants.

At once good transmission bcame possible, and large amounts of power could be produced, though the problem still remained of how to modulate these large currents in accordance with the voice; as it was not practicable to do so by any form of trigger action—that is, one in which the change of a small current produces large changes in the main output.

Perfect articulation could be got by inserting an ordinary land line microphone directly in the aerial of a coupled circuit transmitter, provided the current dealt with was not largely in excess of that for which the microphone had been designed; say ·25 or ·3 amperes; and it is doubtful whether this articulation has ever been much improved on. But larger powers overloaded any form of carbon granule instrument, and the paralleling of these was not very successful.

Thus the microphone was now the weak link in the chain, and a great deal of the energy of inventors was put into producing a microphone capable of handling these large currents.

One of the most interesting of these attempts was the Majorana water jet microphone which could deal with currents of the order of 10 amps. In this a smooth jet of acidulated water from a smooth orifice makes connection as it falls with a couple of small platinum surfaces. The voice is made to agitate the jet, and the necks and bulges formed on the falling column vary the amount of active liquid and so control the resistance. The author had the honour of assisting Professor Majorana in some demonstrations when he came to England, and has seen this instrument controlling currents of more than 10 amps. with success. At the other end of the scale, a field telephone produced by the Marconi Company in 1909 with a small arc in alcohol vapour, without any magnetic field, giving an output of 1 ampere, gave excellent

results with a carbon granule microphone of rather large current capacity directly in the aerial.

This brief historical survey will bring home to us that the true history of wireless telephony begins with the introduction of the three-electrode valve and the regenerative circuit which it makes possible.

This marvellous invention, which has not only revolutionised wireless, but has made its presence felt in other fields of activity, was first introduced as a receiving device, and it is convenient to approach it from this side. The construction and theory of the modern valve has been expounded so often and so well, that it will not be inappropriate to treat of it as well known and familiar.

It differs from all previous receivers in this, that it acts as a magnifier, and hence the application of a small voltage variation to the grid, causes large power variations in the anode circuit. It is well known that a receiving valve may be used for two distinct functions, rectification and amplification. In consequence of the bend of its anode characteristic, an oscillation applied to it produces unequal changes of current on the positive and negative swings, and hence is more or less efficiently rectified according to the amplitude of its oscillation. When this amplitude is very small the bend is so nearly a straight line for that excursion, that rectification is imperfect, and extremely small amplitudes are not rectified at all. It will thus be seen that the valve as a detector, in common with all other rectifiers, deals less and less efficiently with signals, as they become weaker. On the other hand, the valve used as a magnifier can work on a straight portion of its curve, very small changes of grid potential producing much larger power changes in the anode circuit; and it will easily be seen that in this case there is no limit of weakness of signal at which inefficiency is produced. Signals thus magnified, however, still retain the character of high-frequency oscillations and require subsequent rectification to render them audible. Just as the valve magnified high-frequency oscillation, so it can deal with the low or note frequency produced after rectification; and the modern receiver generally consists of an appropriate number of high-frequency magnifications, a detector (which thanks to the increased amplitude that it now has to deal with, is always working fairly efficiently) and any given number of low-frequency magnifications. Popularly speaking, high-frequency magnification gives sensitiveness, and low-frequency strength; and a well-designed receiver consists of a combination of these appropriate to the required conditions. The magnifying power of a valve also makes possible the regenerative or reaction circuit; and one very common circuit utilises a combination of the regenerative and rectifying powers of one valve, which is acting fairly efficiently as a detector in consequence of the amplitude built up by reaction. The signal this produced can afterwards be note-magnified in the usual way. This has some advantages, and up to quite recently was almost exclusively used in aeroplane work. It should be noted here, that the flatly-tuned high-frequency magnifying methods of reception respond only to changes of intensity or amplitude, while the reaction circuit is susceptible also and chiefly to changes of wave-length, owing to the excessive steepness of the resonance curve.

In such a regenerative receiving circuit it will be seen that a slight increase of reaction, beyond the critical point of zero damping in the

system, will cause the latter to oscillate ; and such a system becomes a faultless source of high-frequency alternating current, free from all discontinuity, and so perfectly suitable for telephonic transmission.

At first, valve transmission was limited to small powers, but its efficiency is very surprising to those accustomed to think in terms of spark working, partly because, in contradistinction to discontinuous methods, the whole time is filled with radiation—that is to say, energy is being continuously conveyed from transmitter to receiver instead of in short bursts.

This, broadly speaking, was the state of the art on the outbreak of war. Thanks to the work of Captain Round and his assistants in the Marconi Company, small power but singularly advanced and highly developed sets had been made, of which demonstrations were given in June, 1914, to representatives of the Army, Navy, and General Post Office.

In these demonstrations various methods of control were employed, including not only the coupled circuit system, but also arrangements for modulating in the grid and anode circuits, while the receiver employed definite high-frequency magnification and other refinements.

Shortly after the present writer transferred to the R.F.C., in the early part of 1915, he began the introduction of valve work in the corps ; and was very soon impelled to try and produce a wireless telephone capable of transmitting from the machine to a ground station on the lines of the 1914 sets. It should be remembered that at this time only the very crudest methods of keeping up communication with an aeroplane were in vogue, and to suddenly step to telephony seemed at first an ambition as hopeless as it was dazzling. Nevertheless the goal was finally reached.

The electrical difficulties were not the most serious. The wireless telephone was already practical, but the difficulties of adapting it to air work were almost daunting. The soft valve was still in use, and this was more adapted for handling by skilled personnel than for the rougher usages of war conditions. The transmission has to take place in a region of such intense noise and vibration that the very human voice and ear were almost impotent ; the apparatus had to be simplified so as to be usable by unskilled persons amid the dangers and distractions of the air, and the size and weight had to be cut down to the absolute minimum. All traditions of design had to be abandoned and materials and methods adopted solely as they satisfied conditions till then unprecedented.

The earliest experiment was made with a skeleton set screwed to a board ; the transmitting valve being a tungsten filament one which had accidentally been evacuated to a much higher degree than the then practice was ; so that it may be said to have anticipated, albeit unconsciously, the later use of the hard valve. The few broken words then heard are believed to have been the very first in the world ever transmitted from the air by radiotelephony.

The microphone was another early stumbling block. It was found that no test on the ground was any guide as to its behaviour in the air. A large number of commercial types were therefore secured, and compared by actual trial in a machine. Some of the best standard types proved useless, and the one finally adopted was a rather old type Hunnings Cone.

From these beginnings was developed the first practical radio-telephone set. It was worked on a trailing aerial 250 ft. long, and, using a wave-length of about 300 metres, not very far removed from its natural one, the radiation was good. A coupled circuit was employed, with the microphone direct in the aerial, the current being of the order of 0·25 ampere.

The high-tension supply to this set was from batteries of dry cells giving 600 volts, weighing about 38 lb. each. The set itself weighed 10 lb., and to this had to be added the weight of the filament battery.

This set was not only adapted for telephony, but comprised a key, buzzer, and simple plugging arrangements, so that continuous wave or interrupted continuous wave transmission could be employed at will, and thus in many respects it antedated the latest requirements of the international convention.

The range of this transmitter to an ordinary ground station employing a Marconi "No. 16" circuit was about 20 to 25 miles for telephony, to 30 to 35 for tonic train and about double this distance for CW. On one historic occasion, however, speech transmitted from the air at St. Omer was taken down by the Lowestoft interception station at a distance of about 130 miles.

The author was admirably assisted in the production of this set by Lieutenant (now Captain) McDougald, R.A.F., and remembering that it was the first practical aeroplane telephone ever produced, he cannot dissemble a feeling of satisfaction that the English Royal Flying Corps was the pioneer in a subject which has subsequently become of international importance.

In spite of the hopes that had been entertained of air to ground telephony, the overseas forces found no use for it; but it served to demonstrate the possibilities of the subject, and soon an urgent demand arose for inter-machine telephony—a far more difficult matter technically. Telephonic transmission was no easy problem in any case, where either the transmission or reception had to take place amid violent noise: but the difficulty was, so to speak, squared where both ends were situated amid the intense uproar of an aeroplane.

So great had the difficulty of reception been felt to be, that much ingenuity had been uselessly expended in trying to produce sound-proof helmets and similar devices; and it had been thought that the most practical solution of the problem would be to employ telephony from air to ground, and Morse telegraphy *vice versa*, or for inter-machine working.

In considering the application of wireless to aircraft it is important to remember that, besides working under difficult conditions, it was necessarily operated by either quite unskilled personnel, or by those who could only receive a very slight training. It was this also that favoured—nay, finally even made essential—telephony as against telegraphy. The average pilot or observer could not have sufficient acquaintance with Morse to read it subconsciously, nor had he the time or inclination for it amid the multifarious calls on his attention while flying.

So all energies were devoted to attacking the harder problem, each step being tested in the air at the Wireless Testing Park during a whole winter of very bad flying weather; and in a few months inter-

machine telephony had passed from the experimental into the practical stage.

The early telephony transmitter employing the coupled-circuit system already described, although giving very perfect results for small power, was ruled out on account of the coupling and tuning adjustments and its output limitations, and its successor, the Mk.II. embodied a totally different method of modulation, now commonly known as "Choke Control," in which voice variations are applied to the anode circuit of the oscillating system.

This very effective system was a modification of one of Captain Round's 1914 circuits, and, after a few confirmatory experiments, was suggested by him to the author as likely to fulfil his requirements. It can be briefly described thus.

Let us suppose that in the anode feed circuit of a simple valve oscillator is placed the secondary winding of an ordinary step-up transformer, the primary of which is a microphone and battery circuit. The variations produced by the voice will give rise to changes of potential in the anode feed circuit, which will be equivalent to supplying the oscillating valve with more or less high tension, and will alter the radiation in a sympathetic manner. Let us now introduce another or "control" valve, whose grid is acted on by the original microphone transformer, and whose anode is in series with a one-to-one transformer, in place of the original one. If the two valves are comparable, and supplied with similar high-tension, we are now able to apply a modulation or variation of the same order as the energy dealt with by the first or "power" valve.

In the actual circuit employed, the control valve is supplied from the same source of high-tension as the power valve; the transformer becomes a choke coil (which is, in effect, a one-to-one transformer) and the filaments and the microphone primary circuit are worked off the same low-tension battery.

It will be seen that the anodes of both valves draw their high-tension d.c. supply through the choke winding, and as long as the microphone is quiescent, the output and general behaviour do not differ from that of the power circuit considered as a plain one-valve oscillator. When, however, variations take place in the control-valve anode circuit at speech frequency, very large surges are set up in that of the power valve, which may approximate to the original high-tension d.c. potential and so sweep the output from nearly double its steady value to almost zero.

"Choke control" proved pre-eminently suitable for air working. There are no critical adjustments anywhere. Almost every constant can be changed within quite wide limits, and though it may thus be caused to work more or less efficiently, it never reaches a point of complete failure. This design lent itself very well to the greatest simplification, so that the transmitting set had no adjustments whatever to be made by the user, and things were so arranged that the set proper could be mounted at a distance in any convenient position, and a very small control unit for operating it (which carried only a switch, an aerial ammeter, and plugs for microphone and telephone receiver) was brought within reach of the user's hand. This "Remote Control" not only was useful in machines where space was strictly limited, but tended to mental directness—a very important point in war instruments—by

removing from the user's contemplation all technical complexities. The soft valve had by this time been abandoned, and the valves used in this set were hard, of the French type, and capable of handling about 20 watts. The high-tension current was supplied by an air-driven generator at 600 volts d.c., across the low-tension commutator of which the filament lighting battery was floating.

The receiver which was the complement of this transmitter consisted essentially of a detector valve with reaction, and two note magnifications, and the application of remote control to the reaction in this circuit involves a technical point of some interest.

The principle is, that the increase of emission caused by brightening the filament of the detector valve, whose anode current is concerned in the reaction, steepens the characteristic curve and so determines the oscillatory condition, when the circuits have been adjusted near the critical point. The adoption of this principle had a large share in the success of the aircraft telephone, partly for the mechanical reason of having only a small control unit near the user, and also because to alter the reaction electrically in this way makes but an infinitesimal change in wave-length; whereas in mechanical methods small changes of capacity are inevitable with every adjustment, and necessitate a slight retuning, so that it needs some skill and finesse to get the best results. With this remote control, however, the user could get the tuning once for all, and adjust the reaction freely for the best effect by a safe and easy change in a low-frequency non-oscillatory circuit.

Thus both transmitter and receiver could be operated from their small control units without the need of any technical knowledge whatever on the part of the user.

The difficulty of finding a suitable microphone for use in the uproar of an aeroplane had, in the meantime, rather increased than diminished, as engines of greater and greater power began to be used. But after much experiment the Gordian knot was cut thus: by devising a microphone almost insensitive to the sounds of the noise intensity, but responsive to the powerful concentrated sound waves of a voice impinging upon it from a very short distance. In other words, the voice was raised to a higher power, as it were, by speaking very loudly, and thus two distinct orders of intensity were produced, which could be separated. By the insertion of a large condenser in the earth lead across which a pair of head receivers were connected, the low-frequency impulses were picked up, and enabled the user to hear the effect of his own speech, which had an important bearing upon proper articulation in the air. Without this, anyone speaking in a noise so great as to drown his own voice, was rather in the position of a deaf mute, who can only judge of the effect he is producing by relying on the known position of his organs of speech.

The most difficult part of the user's education was in fact simply that of articulating properly in the air, where no factor of safety, so to speak, existed. Slovenly speaking, which would be understandable in a quiet room, is completely unintelligible under those extreme conditions, and in the Wireless Telephone School, established for training purposes, no small pains were taken in this matter.

It was highly desirable, moreover, that both occupants of a machine should be able to talk one with the other, and also be aware of all radio communications that took place. To effect this the wireless apparatus

was connected, by an ingenious balanced circuit devised by Capt. Cohen, of the G.P.O. Research Laboratory, to a small local intercommunication telephone in such a manner that the wireless was superimposed upon the other speech. Thus both aviators could hear whatever was transmitted, but either of them could break in upon it in order to speak to the other in case of urgency. In machines receiving only, the intercommunication microphones were of the throat type; but as these were not quite equal to the demands of wireless transmission the transmitting machine was equipped with an ordinary microphone for this purpose.

Such, in very brief outline, was the apparatus installed. For a long time the tactical use of it did not call for two-way working; and thus machines were equipped either for transmission only—as in the case of a leader who had to transmit orders—or reception only, by which the machines of his flight or squadron were enabled to receive them. Later on, when a demand for two-way working arose, it was easily satisfied by installing both sets of apparatus, and arranging some form of switch-over.

The true use of wireless telephony was considered, by those actually in the field, to lie in the equipment of the fighting units, and not those engaged in reconnaisance, artillery observation, or similar work. This, again, did not make the path of telephony any smoother, since it was not only working under the most difficult conditions possible, but it was adding another "gadget" to the already overburdened fighting pilot, who was not inclined to look favourably upon it—at least, until experience had convinced him of the new power it placed in his hand, of fighting in formation.

However, so important was it considered to be, that a special school of wireless telephony was instituted under Capt. Furnivall, who had been one of the author's earliest assistants. Through this passed a succession of fighting pilots for a course of training in articulation, the use of the apparatus, and the elements of manœuvring in formation by telephonic orders. More than a squadron of training machines were kept constantly engaged, and, besides the pilots, selected wireless officers were trained in the maintenance of the apparatus by a staff each of whom specialised in some point—such as machine wiring, elocution, helmet-fitting, and the like—and thus a whole organisation grew up, as wireless telephony threatened to supersede all other means of communication to aircraft. It took on great importance, too, for home defence against air raids; and a chain of ground stations of considerable power was put up (technically exactly similar to the aircraft transmitter on a larger scale) which were capable of transmitting up to about 100 miles to a machine in the air, in order to warn the patrols of the approach of an enemy.

After the signing of the armistice the Cologne postal service was equipped, both ground and air, entirely with the little aircraft sets, and some remarkable results were obtained. This was installed and equipped by a wireless telephony section organised for the purpose at Marquise. The ground stations, which had 70 ft. masts, were set at 50 miles apart, and could transmit 30 miles to a machine, or receive the machine at a distance of 50 miles. These are conservative figures, and frequenty an intermediate station could be omitted and a machine could be in communication with three of the stations on the route. The central

station on this route handled 5,000 messages during the five months it was in operation.

Although it was not possible to bring it to sufficient perfection in time to be of use in the war, it may be interesting to touch briefly upon the attempts made to work with fixed aerials rigidly attached to the wings and fuselage of the machine, in place of trailing aerials, which were an embarrassment in fighting. Since it was not possible to increase the transmitting power without providing completely fresh apparatus, and at the normal wave-length of 400 metres the radiation from such a fixed aerial was very poor, the attempt in practice was confined to producing more sensitive receivers, leaving the transmitting machine only with a trailing aerial as before.

By this time the problem of making a stable, nearly aperiodic, cascade series of high-frequency magnifications had been solved, and in the light of this advance a five-valve receiver was designed by Major Whiddington, in which a choice was made of two high and two low-frequency magnifications, with a detector valve.

This receiver had from 10 to 30 times the sensibility of the standard one, and thus in spite of the diminished radiation of the fixed aerial the normal range was approximately restored. Since, however, the new type of receiver had not come into general use up to the time of the armistice, all the actual work was done with the three-valve receiver and transmitter already described. Trailing aerial wires of 120 ft. length were used in the transmitting machines, with an aerial current of the order of 0·4 ampere, while the receiving machines had aerials of from 80 to 100 ft. in length. The normal safe working range from machine to machine was about four miles (though this was often very much exceeded) while the range to a ground station was from 20 to 50 miles or more.

It is obviously impossible to describe within the limits of a short article five years of work and development in a subject which, begun by the author almost in jest, has now risen into one of world-wide interest and importance, and which must continue to grow with the growth of aviation ; but it is hoped that from this meagre account the reader may have gathered something of its genesis and present position. To this position it would not have risen in the stress of war without the help of a loyal band of enthusiasts, who kept their faith in difficulties and discouragements, some of whom even lost their lives. One of their most cherished testimonials is the captured German Order, acknowledging that we were much ahead in C.W. and telephone work, and urging the capture of some of the apparatus, for which a reward was offered, as this would " save many thousands of marks in experimenting."

The work of the other belligerents has not been touched on, although both the French and Americans produced good apparatus, because, as far as the author is aware, it was only in the English flying service that telephony developed into a working organisation of any magnitude. Much of the English lead was no doubt due to extreme simplification, to efficient training and maintenance, and to designing always, not to a laboratory standard, but to the actual conditions of manufacture, personnel, method of use, and tactics.

It only remains to conclude by indicating the lines on which the most recent apparatus with which the author is concerned is developing.

The International Convention having laid this down as the maximum allowable, the transmitter will deal with an input of 100 watts, and choke control will be retained. All types of transmission will be provided for. The receiver will have three high-frequency magnifications and one low, making with the detector, five valves, and the combined transmitter and receiver will be worked from one remote control. Batteries will have to be retained at present for filament lighting, but they can be small ones floating across the generator; and there seems good reason to hope that in the near future a perfectly silenced and regulated generator will permit of the abolition of the battery, all current, even for the receiver, being supplied direct from the dynamo.

Ground stations will be equipped for direction finding, with a transmitting mast one or two hundred yards away controlled from the receiving building, and matters will probably be so arranged that the ordinary P.O. land lines can be plugged direct on to the wireless, so that a man may talk direct from his office to a machine in the air.

DIRECTION FINDING

By G. M. Wright.

THE determination of the direction from which a wireless wave is arriving at the receiving station is a problem of the greatest practical importance in the navigation of a ship or aircraft in thick weather. Imagine a ship to be approaching the English Channel after a long run across the Atlantic. If the navigator has been unable to obtain a fix, from astronomical observations, for some days he is compelled to rely on an estimate formed by dead reckoning. The position by "dead reckoning" is obtained by plotting on the chart the ship's course, and measuring off along this line the distance run from the last definite position obtained. It must, however, be remembered that allowances have to be made for the effects of wind, currents and tides on the course as set on the standard compass, and on the distance run as given by the patent log. The accuracy of the estimate of the effect of these disturbing influences is entirely dependent upon the knowledge and experience of the navigating officer, and under abnormal circumstances of weather, etc., the estimated position may be considerably in error. The great value of the wireless direction finder is obvious under such circumstances. If the ship is equipped with D.F. apparatus every wireless station becomes a beacon on which a bearing can be taken, and the combination of two or more such observations on different stations will enable the navigator to fix the ship's position accurately, the most valuable property of the method being that it is possible to obtain the bearings under any conditions of weather, the readings being, of course, entirely unaffected by mist or fog.

Under these circumstances it is not surprising that investigators in the field of wireless telegraphy have in the past devoted a considerable part of their energies to the discovery and perfection of methods of direction finding. Marconi, in the early days of wireless, first used his bent antenna as a direction finder. Since such an aerial receives best when the horizontal part is pointing directly away from the transmitting station, it is clear that an estimate of the direction of the sending station can be obtained by swinging the aerial round until the received signals are of maximum strength. Or, alternatively, a series of such aerials may be erected with their horizontal parts extending radially from the station and disposed at definite angles apart; then by connecting each aerial in turn to the receiver by means of a switch the direction of the incident waves can be found by noting which aerial gives the strongest signals. This arrangement is mentioned as an example of one of the early attempts to find a solution of the problem. No really practical method was evolved until Bellini and Tosi conceived the idea of combining the directional effects of two semi-closed loop aerials in such a manner as to give a direct reading of the direction of the incident waves on a small instrument in the wireless room. The idea was a fundamental one, and it is still the base of the modern direction finder, although much work has been done to perfect the

apparatus and the mode of application of the principle. In view of its importance we propose to give a brief description of the method before passing on to practical considerations and recent developments.

An aerial consisting of a closed loop of wire tuned by means of a suitable condenser to the wave-length of the incoming signals possesses directional properties. Such an aerial is shown diagrammatically in Fig. 1; and it is found that the strength of the received current varies with the angle between the direction of the incident wave and the plane of the loop, being a maximum when the transmitting station lies in this plane and zero when the wave arrives broadside on. That this is the case will be easily seen by reference to Fig. 2. In this figure we

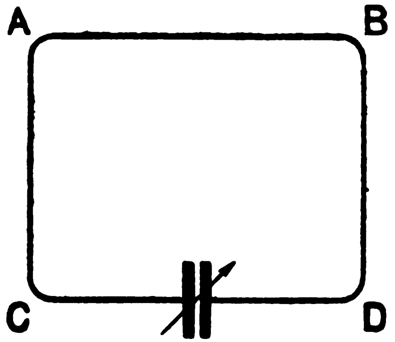


Fig. 1.

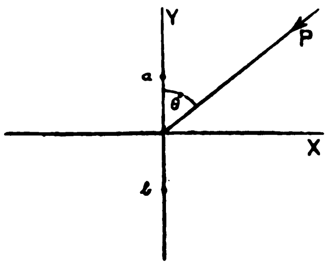


Fig. 2.

have shown the loop in plan, the dot *a* representing the limb *AC*, and the dot *b* the limb *BD* (see Fig. 1). Now consider a wave arriving from the direction *OY*, with magnetic field horizontal and electric field vertical. As the wave passes a varying magnetic flux will be linked with the loop, the frequency of the variations depending upon the wave-length being received. This varying flux will induce an E.M.F. in the frame, and since we are assuming the circuit to be tuned to the correct frequency, a current will flow. But, on the other hand, if the wave is arriving from the direction *OX*, it is clear that there will never be any flux linked with the loop. Consequently, no E.M.F. will be induced and no current will flow. It is also obvious that the maximum linkage occurred when the wave arrived along *OY*, so that we see that the induced current is a maximum when the plane of the frame is in the direction of the transmitting station and is zero when at right angles. If now the incident ray is coming from some intermediate direction, such as *OP*, the resulting current is less than when coming from *OY* and is given by

$$I = I_{max.} \cos \theta,$$

where $I_{max.}$ is the current when the direction of the ray is along *OY*, and θ is the angle between *OY* and the incident ray.

A single loop of wire can thus be used for the determination of directions. By rotating the loop on a vertical axis we can observe its position when signals vanish; then the plane of the loop must lie at right angles to the direction of the transmitting station. At first sight

this might appear to be the simplest form of direction finder it is possible to construct, but it is found in practice that there are serious difficulties in the way of making use of this method. Among these are (1) the difficulty of turning round a frame aerial of any size; (2) if the aerial is made small to avoid (1) the receiving power is reduced and the receiver amplification must be increased to compensate; (3) the small, easily handled frame introduces difficulties on account of the fact that the jiggers, etc., employed in the receiving circuits have a certain receiving power themselves, which may be comparable to that of the aerial if the latter is reduced to very small dimensions—we shall refer to this effect later and explain the errors introduced by it; (4) the increased effect of "non-directional" component. The system due to Bellini and Tosi obviates the necessity of swinging the aerial round; consequently large frames may be used without losing speed and accuracy in taking bearings.

Suppose now that two exactly equal frame aerials are erected at right angles to each other. In Fig. 3 these aerials are shown in plan by the dots *ab* and *fg*. In Fig. 4 these aerials are shown connected to equal coils C_1 and C_2, also situated at right angles. Each aerial is

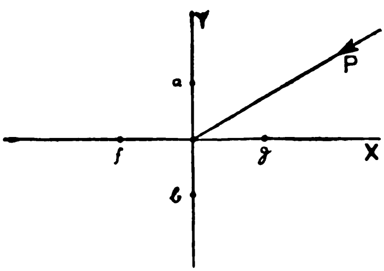


Fig. 3

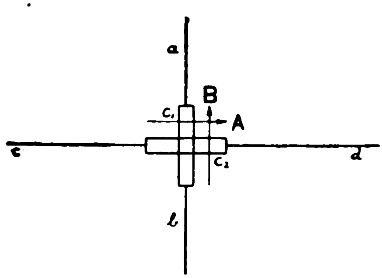


Fig. 4.

assumed to be tuned to the same wave-length—*i.e.* that of the incoming signal, the tuning condensers being omitted in the diagram for the sake of clearness.

Referring again to Fig. 3 we will take the case of a signal arriving from the direction P at an angle θ with the frame in the OY direction. Now from the previous discussion of the value of the current induced in a frame by a wave at different angles of incidence it is clear that

$$I_{ab} = I_{max.} \cos \theta \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

and

$$I_{fg} = I_{max.} \cos (90 - \theta)$$
$$= I_{max.} \sin \theta \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

It will be seen in Fig. 4 that the current in *ab* will result in a magnetic flux in the coil C_1 in a direction represented by the arrow A, the intensity of the field being proportional to the current flowing in the aerial connected to the coil. Similarly, the current in the aerial *fg* will result in a field B whose intensity is represented by expression (2) above. These two fields are obviously at right angles to each other because we assumed the coils to be perpendicular. These two fields will be added vectorially and will produce a resultant field somewhere between the two.

In Fig. 5 let OB represent in direction and magnitude the field B, and OA the field A. OB will then be of length $I_{max.} \cos\theta$ and OA of length $I_{max.} \sin\theta$. The resultant OR will be found by completing the parallelogram. Let the angle BOR be φ. Then

$$\text{Tan}\,\varphi = \frac{BR}{OB} = \frac{OA}{OB}$$

$$= \frac{I_{max.} \sin\theta}{I_{max.} \cos\theta}$$

$$= \text{Tan}\,\theta$$

Therefore $\qquad \varphi = \theta$

Or the angle which the resultant field takes up with respect to coil C_1 is the same as the angle of incidence of the wave on the aerial ab. So that if we can determine the position of this resultant field we can at once fix the direction P (Fig. 3).

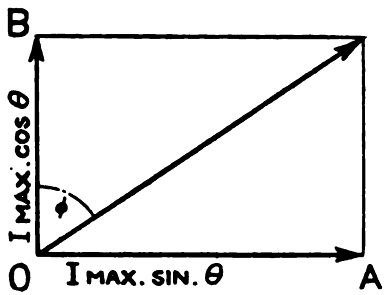


Fig. 5.

It now only remains to be seen that the resultant field produced in the radiogoniometer is, for a signal of given intensity, constant in strength, no matter what is the angle of incidence of the wave on the aerial system. Let $I_{max.}$ again denote the current in the aerial when the direction of the signal coincides with the plane of one of the loops. Then, referring to Fig. 3, if the incident ray makes an angle with the OY frame we have seen that

$$I_{ab} = I_{max.} \cos\theta$$

and $\qquad I_{fg} = I_{max.} \sin\theta$

Since the fields due to these currents are at right angles it is clear that the resultant field is proportional in strength to

$$\sqrt{I_{ab}^2 + I_{fg}^2}$$

or $\qquad I_{max.} \sqrt{\cos^2\theta + \sin^2\theta}$

That is to $I_{max.}$. We thus have the important result that the intensity of the flux in the radiogoniometer is quite independent of the direction from which the wave arrives, but is only governed by the strength of the fields in the wave.

It is therefore clear that, since the field in the radiogoniometer corresponds in direction with and is proportional in strength to the original wave, we can determine the direction of any signal by rotating a small coil in this field and noting the position where no signals are heard. We then know that the axis of this small exploring coil is at right angles to the field in the radiogoniometer.

In the foregoing paragraphs we have tacitly assumed that the currents in the two aerials are exactly in phase with each other. This condition does not necessarily obtain in practice. It is clear that, provided the electrical centres of the two aerials are coincident, the

E.M.F.'s induced in the loops will be in phase. This follows immediately from the fact that the loops are cut by the same flux simultaneously. The currents which flow as a result of these E.M.F.'s may, however, bear any phase relation to the E.M.F.'s themselves, depending upon the preponderance of inductive or capacity impedance in the aerial circuits. If each aerial is tuned by means of a variable condenser the capacity reactance in the circuit can be altered at will (being equal to the inductive reactance at the point of tune). If the resistance of the circuit were zero the current would lag 90 degrees on the E.M.F. induced by the wave when the capacity of the tuning condenser is slightly too large, and would lead 90 degrees when the capacity is a little too small. A practical loop aerial has a very low resistance, and consequently the adjustment of the tuning condensers to give the correct phase relation between the currents in the two loops is of a very critical character. If the phase adjustment of the aerial current is incorrect a rotating field is produced in the radiogoniometer superimposed upon the normal stationary field. This rotating field results in ill-defined minima combined with a displacement of the observed direction. This displacement is small and varies with direction of the incident wave.

It is also necessary that there should be no coupling, neither magnetic nor electrostatic, between the two aerial systems. The necessity for this condition is self-evident, since any coupling will result in a transfer of energy from one aerial to the other, thereby disturbing the correct relation between the aerial currents. It might be imagined, at first sight, that this effect would cause considerable errors in observed bearings, but it can be shown that owing to the phase relations of these "coupling currents" the chief effect is to give a more or less blurred minimum and a bearing taken by the swing method is not very seriously disturbed. However, in practice it is necessary to test and compensate for any such coupling in order to ensure a crisp minimum —which is a most desirable operating condition.

We have referred above to "minimum, reading." It is to be noted that extensive practical experience has proved beyond all doubt that it is always best to employ some method of taking bearings which involves a "swing" in the neighbourhood of the point on the scale where the signal vanishes. It is not desirable, for reasons we shall give later, actually to read the minimum itself, although it is generally quite sharply defined. In taking a bearing the position of the minimum is roughly noted by a rapid turn of the exploring coil of the radiogoniometer; then the pointer is placed about 20 degrees, say, from the minimum and the signal strength carefully observed; by swinging *through the minimum* a position can be found where the strength is the same as it was at the point on the other side. A few rapid swings enable the strengths to be matched accurately—the mean of the two readings then giving the position of the true minimum. Direction finding stations are always adjusted in such a manner that the minimum reading is the true bearing of the station under observation, thereby avoiding the necessity of any corrections with their resultant chance of error.

We have referred to "vertical component" in the above discussion of frame reception. By this we mean the tendency of the aerial to oscillate to earth. Imagine the exploring coil of the radiogoniometer

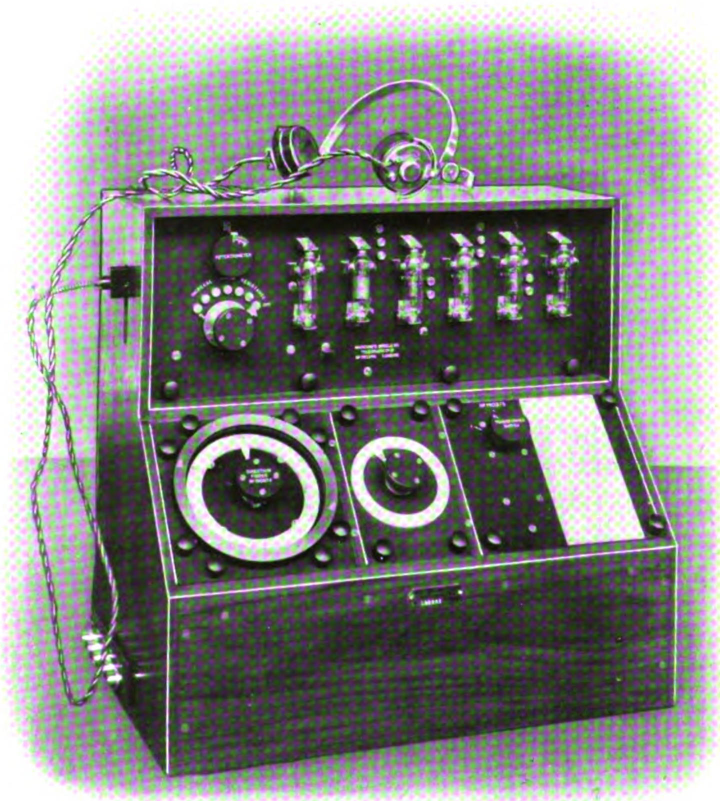


FIG. 9. DIRECTION FINDER (MARINE PATTERN) TYPE II.

[To face page 950

to be tuned by means of a condenser, the terminals of this condenser being connected to the grid and filament of the first valve of a cascade amplifier as shown in Fig. 6. (We have, for the sake of clearness, only indicated one loop aerial.) Now the filament batteries will have a certain fairly large capacity C to earth, and are connected to one side of the condenser K; on the other hand, the grid will only have a very small capacity c to earth, and it is connected to the other side of K. Electrostatically, then, the circuit can be redrawn as shown in Fig. 7. It is at once clear that when a wave is passing the aerial an E.M.F. is produced between the loop and earth, and, owing to the inequalities of the capacities C and c, an E.M.F. will be produced between the points f and g. This E.M.F. will exist no matter what the position of the exploring coil may be, and will result in either (*a*) a bad minimum or (*b*) a good minimum displaced from its correct position, or a combination depending upon the phase relation between the current in the loop and the vertical component.

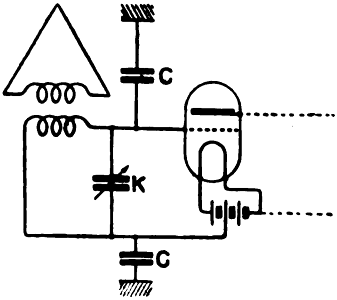


Fig. 6.

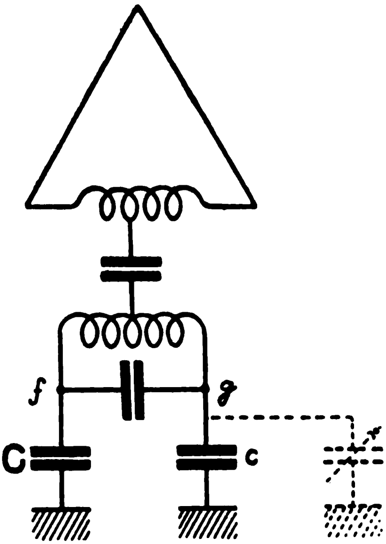


Fig. 7.

There are various ways of eliminating this non-directional effect. We shall content ourselves with an indication of two methods. Referring again to Fig. 7, we have seen that the non-directional effect is due to the difference of capacity between C and c. If, then, we equalise up these capacities by connecting an adjustable condenser from g to earth we shall balance out the effect. This method is found to work quite well in practice, a small " billi " condenser connected between the grid of the first valve of the amplifier and earth being all that is required.

The second method is shown diagrammatically in Fig. 8. A special aerial is employed and a couple of down leads are provided from the apex of the triangle. A tuning condenser is connected in these leads and the radiogoniometer field coil is inserted in the base lead, the mid point of this field coil being permanently earthed. The effect of the earth is to ensure that the fixed coil remains at zero potential with respect to earth under all conditions. Since non-

directional component depends for its existence upon fluctuations of potential of the field coil, the above arrangement will eliminate it. As a practical arrangement it is also desirable to have an earth on the aerial system of a D.F. station, otherwise the apparatus becomes " live " during thunderstorms or " fizzly " atmospherics. Special transformers have also been devised for the elimination of non-directional effect.

We have referred above to the necessity of accurate balancing of the aerial systems before using the direction finder for taking bearings. It will be realised that this is a difficulty when it is desired to place the instrument in the hands of comparatively unskilled operators. The trouble has been overcome recently by the so-called " aperiodic " system. In this arrangement the radiogoniometer is constructed so as to have a very tight coupling; it then forms a transformer, and the aerials may be tuned by means of a variable condenser connected across the search coil. It will be observed that both aerials are tuned simultaneously and that no balancing is required.

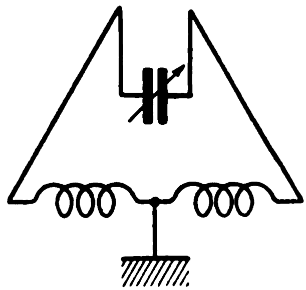


Fig. 8.

This aperiodic system is coming largely into use for practical direction finding stations, and we illustrate in Fig. 9 a type of apparatus manufactured by the Marconi Company principally for use on board ship. This figure shows the complete instrument, which is of small size, as can be seen by comparison with the pair of telephones lying on top of the cabinet. Fig. 10 shows the radiogoniometer unit, in which the field coils can be clearly seen. There is also one tuning adjustment to be made—namely, that of the variable condenser (the central panel of Fig. 9). A multi-valve high-frequency amplifier gives the necessary amplification for all ordinary purposes.

Much has been said and written concerning " night effect." Night effect is the name given to irregularities in bearings which are sometimes noticed under certain conditions. The observed phenomena can be divided broadly into two groups.

1. Bearings may be quite sharp, but inaccurate.
2. The minimum may be ill defined, and more or less displaced.

The most dangerous type of night effect is obviously type 1, because the observer has no means of recognising its presence; indeed, the sharp minimum may lead him to suppose the effect is absent. Fortunately, *when working on spark signals*, this type of night effect is of very rare occurrence. It is frequently observed on C.W. working, and it is for this reason that most practical D.F. work is confined to spark signals. Night effect of type 2 is more common, but the presence of the ill-defined minimum at once warns the observer that the effect is present and the bearings taken are treated with caution until a satisfactory intersection is obtained.

Night effect is connected with the presence of land between the transmitting and receiving stations. It is always more marked

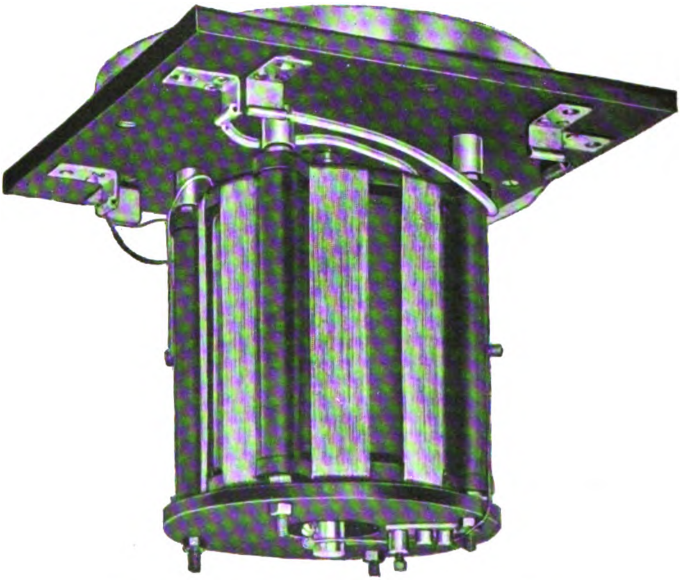


FIG. 10. THE DIRECTION FINDER COMPONENT.

[To face page 953

when such land exists, and in the case of mountainous or difficult countries may assume serious proportions. In the case of marine D.F. work, of course, the majority of bearings are taken over clear sea, so that any night effect which may be observed is likely to be of very small magnitude. It is for this reason that when taking bearings from a ship fitted with direction finding apparatus it is always preferable to take bearings on the ordinary commercial coast stations rather than on long-wave high-power stations which may be at a considerable distance inland.

The exact cause of night effect is still a matter of some doubt. The most probable explanation is that proposed by Eckersley. According to this theory, the variations in bearing are due to variations in the plane of polarisation of the ray reflected from the Heaviside layer. Space will not allow to enter into the details of the theory, but certain corroborative evidence may be quoted briefly.

1. Signals may be received on a horizontal frame during night effect, whereas no current is induced in such a frame by the direct ray.

2. Night effect is more marked on C.W. than on spark waves.

3. Intervening land increases the effect. (Due to weakening of direct ray.)

4. That a ray irregularly polarised does produce something like night effect is illustrated by the well-known variations of bearing observed when the transmitting station is an aeroplane flying very close to the D.F. station.

Our knowledge of the mechanism of night effect is being rapidly extended, and there is no doubt that means will be discovered for its elimination. This is a very important subject of research, as a solution of the problem will at once make D.F. work over land at night as reliable as marine direction finding under the same circumstances.

THE BERNE BUREAU

A "Clearing House" for Radiotelegraphy

BERNE, the capital city of the canton of Switzerland bearing the same name, is the place of residence of the Foreign Ministers accredited to the Confederation, and the permanent seat of the Swiss Government and Diet. Switzerland has always been characterised by the trait of internationalism, and at her metropolis are located what may be regarded as the clearing houses for international communication. The Postal Union, for example, which secures international uniformity in the treatment of correspondence and the rates charged therefor, was established in that city during 1875, and the Copyright Union followed in 1886.

After the birth of Wired Telegraphy, in 1837, the rapid spread of the new means of communication very soon aroused an insistent demand for international organisation; and in 1868 the Bureau of the International Telegraph Union, situated at Berne, was instituted to satisfy the need.

Next in rotation came Wireless, and it was speedily evident that some international agreement with regard to control was absolutely necessary if chaos in the ether were to be avoided. The first International Conference sat at Berlin in August, 1903, and a second followed in 1906, whilst what is known as the International Radiotelegraphic Convention of London was held in July, 1912. At this latter the regulations at present in force were finally crystallised in concrete shape. These appear *in extenso* on page 46. Under these regulations (which are, of course, only binding upon the signatories to the Convention and those Powers who have since signified their adherence thereto) a central agency has been established constituting a section of what is commonly known under the title of "The Berne Bureau."

This organisation forms merely a branch of the Bureau of the International Telegraph Union, possesses no initiatory or executive power (except that of allocating call letters) and is only allowed the right of expending 80,000 francs per annum in the discharge of its duties. Amongst its principal functions it is entrusted with the duty of collecting, co-ordinating and publishing such information (in accordance with Article 13 of the Convention) as may be forwarded to it concerning radiotelegraphic land and ship stations. This information includes, *inter alia*, the names, nationality, geographical positions, call signals, normal ranges, wave-lengths, nature of service performed, and hours of working. It circulates, moreover, in appropriate form any proposals that may be received for the modification of the International Radiotelegraphic Convention of London, whether such proposals affect the Convention itself or the regulations attached thereto. It notifies any changes that may be adopted, and generally holds itself at the disposal of signatories of the Convention for any administrative work in connection with international radiotelegraphy. Arising out of this receipt and circulation of suggestions, the Bureau collects and prepares for discussion any matters which it may seem desirable to bring before the next International Conference, such meetings being planned to

take place at intervals of five years, more or less. During the session of these conferences the Bureau attends to the supply and printing, editing, and distribution of all necessary documents.

It is obvious that the utility of such an organisation must largely depend upon the way in which the work is carried out ; and—thanks to the zealous, economical, and efficient methods pursued by its officials—the International Bureau of Berne has become an organisation of supreme importance. The expenses of its maintenance are jointly borne by the contracting parties of the International Radiotelegraphic Convention. As stated above, the normal supplementary expenses incident to the discharge of its routine functions must not exceed 80,000 francs per annum. This sum, however, does not include any special expenditure, such as is necessitated by the calling and holding of an International Conference. For the purpose of fixing their respective contributions towards the expenses, the governing bodies of the contracting States have been divided into six classes, as set forth in Article XLIII. of the Regulations.

In the execution of its functions it has been found necessary to issue a number of printed publications, amongst which may be enumerated the records of the various Conferences, the official text of their resolutions, a periodically revised alphabetical list of call letters (at present printed in three languages), the monthly supplements relative to the latter (also in three languages), general statistics regarding radiotelegraphy, notifications of events, circulars, and circular letters. In addition to the above, the Bureau publishes, from information placed at its disposal, a telegraphic journal in French. This publication forms the official organ of all matters relative to radiotelegraphy. The Bureau has been requested by the London Conference to publish, and periodically revise, an official map of the world's radiotelegraphic stations, indicating particularly the coast stations, their normal range, the principal steamship routes and the time normally taken by steamers for the crossing between various ports. The first edition of this map will probably appear towards the end of the year 1920.

As an illustration of the good work carried out by this invaluable organisation it may be not without interest to briefly recapitulate a matter of considerable importance which was dealt with in the course of 1917.

At the time when the standard arrangements for call letters were originally fixed it appeared as though the combinations and permutations of the Roman alphabet of twenty-six letters, triply repeated, would suffice for present and future needs, and it was therefore arranged that each station should be given a call signal of three letters. At such a rate, however, has radiotelegraphy progressed that the time has already arrived when all possible combinations and permutations within such limits have been exhausted by at least two States. Before this happened, however, the Berne Bureau called attention to the matter in a general circular, and asked the parties to the Convention for their suggestions.

The British Administration proposed that after the combinations of the present system were exhausted, each Administration should be authorised to utilise signs of four letters formed by the letter T followed by one of the combinations reserved for its own special use. The Bureau again circularised its members with the British suggestion.

Out of the 71 Administrations concerned, 28 replied. Of these replies 23 supported the British proposal. The Administrations of Germany and the Netherlands each made counter-suggestions. The former approved of the combinations of four letters made by the addition of the letter T, but suggested that this addition should follow the triple combination instead of preceding it. The Netherlands, whilst in general agreement with the British solution, suggested the replacement of the letter T by the letter P. France, Morocco and Tunis, the remaining dissentients, gave it as their opinion that it would be expedient to postpone the consideration of the matter until the meeting of the next Radiotelegraphic Conference after the conclusion of peace.

As soon as this work of circularisation had been carried out by the Berne executive, and when all replies had been received, a further announcement was sent out by the Bureau stating that in view of the fact that all decisions to be binding must be unanimous, the proposals of Great Britain, as well as the counter-suggestions of Holland and Germany, must fall to the ground.

Agreement of all parties, however, could not be obtained by means of correspondence through the Berne Bureau. Circumstances demanded an immediate solution of the difficulty in the case of Great Britain and the U.S.A., as their original combinations were exhausted. These countries accordingly brought into use a four-letter call, the first letter of which was respectively allocated to them in the original distribution of the three-letter series. This was adopted as a temporary measure pending international agreement on the subject. The result is that Great Britain now uses a four-letter series commencing with "G," and the United States a four-letter series commencing with "K," "N," or "W."

The incident detailed above forms a good exemplification of the manifold activities carried out in the Swiss capital, and it will serve to indicate the complication of the issues, the efficiency of the organisation required for dealing with them, and the impartiality of spirit which must be displayed amid the clash of conflicting nationalities. Everyone acquainted with the difficulties of office and administrative routine cannot fail to appreciate the care and expert knowledge devoted at this International Radiotelegraphic Clearing House to the allocation of call letters, the conducting of correspondence and controversy with regard to International Rules and Regulations, and the supervision of the publication of the various documents. It forms a striking testimonial to the officials of this Bureau that all through the recent European war its labours were continued without intermission, although, of course, the warring nations were obliged in their own interests to curtail very considerably the amount of information which they would automatically in times of peace have placed at the disposal of the Berne officials. The director, Colonel Dr. E. Frey, and the indefatigable assistants who accord him their whole-hearted support, are to be congratulated upon the way in which they have passed through this great ordeal.

PATENT SECTION

(A) Valve Patents during 1919.

(B) British Patent Specifications.

(C) Name Index to British Patents.

(D) U.S.A. Patent Specifications.

(E) Name Index to U.S.A. Patents.

VALVE PATENTS FOR 1919

By I. Shoenberg.

Brit. No. **123,126.** By the Western Electric Co., Ltd.

The following method of preparing coated filaments for cathodes of valves is claimed as possessing special advantages.

A filament core of platinum or platinum alloy is covered with a coating consisting of a mixture of compounds of metals of the alkaline earth group in a suitable proportion with the compound of a noble metal such as gold, silver or platinum. As in other methods, the coating is formed by passing the filament through a trough containing the mixture in a fluid or plastic condition. The filament is then heated by a current in order to bake the coat. The process may have to be repeated four or five times. The following table gives the proportions (in molecular parts) of the various ingredients for a silver containing coating mixture :—

B_aO	S_rO	C_aO	A_g	
½	½	—	2	The compound of silver used was the oxide $A_{g_2}O$.
⅓	⅓	⅓	1	
⅓	⅓	⅓	2	
—	1	—	1	
1	—	—	1	

The emission from filaments with silver in the coat is very high even at comparatively low temperatures. Owing to this, the life of such a filament is very long. Besides increasing the emission and lengthening the life of the cathode, the presence of metal in the coat also results in the electron emitting materials adhering more firmly to the filament.

Brit. No. **126,030.** By Société Française Radio-Electrique.

It is proposed to use a valve with a mercury anode for the purposes of generation, in the same way as an arc. The arrangement is shown on Fig. 1, where 1 is an evacuated vessel, 2 a filament heated by battery 3, 4 a mercury anode and 7–8 the oscillatory circuit. The device 1 possesses a falling characteristic and the action of the arrangement is identical with that of an arc generator.

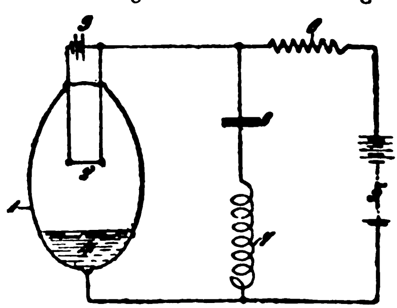


Fig. 1.

Brit. No. **126,658.** By M. Peri and J. Biguet.

The specification describes the well-known construction of a valve shown on Fig. 2. The claims of the patent read as follows :—

1. "A vacuum apparatus intended to serve as relay or generator of maintained oscillations in which the filament, the grating and the plate are concentrically arranged and fixed directly to the wires serving as conductors, these wires being sealed in the same glass tube soldered to the opening of the bulb, the filament placed at the centre of the system being stretched between two conductors

having a certain elasticity, and the grating formed of a spirally rolled wire supported by its two ends, the plate being cylindrical and surrounding the two other elements, the said plate being attached to its conductor by one or two hooks.

2. "A form of construction of the grating characterised by the use of two concentric spirals, one of which is made of relatively thick and short wire and serves as support to the other made of fine and long wire substantially as described.

Brit. No. **127,008.** By Société Française Radio-Electrique.

The invention concerns the method of modulating by speech the amplitude of oscillations generated by a valve. As shown on Fig. 3 the anode circuit contains the antenna, and the coupling to the grid circuit is effected by means of coils 8 and 16. The connection between the

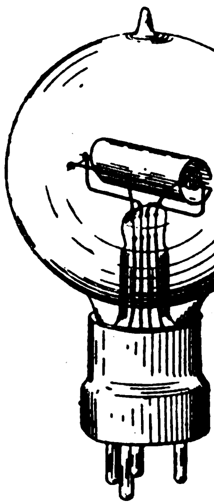


Fig. 2.

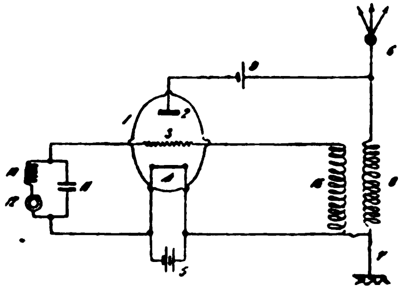


Fig. 3.

lower ends of these coils is necessary in order to impress the voltage of battery 9 between plate 2 and filament 4. So far, the arrangement will generate in the antenna continuous oscillations of a constant amplitude and of a frequency depending on the elements of the aerial. In order to modulate the amplitude in accordance with speech, circuit 10–11–12 containing the microphone 12 is inserted between grid and filament. This circuit is tuned to the frequency of the generated oscillations and its impedance is therefore (for the same reason as in "rejector" circuits) very high. "Under these conditions," the inventors state, "the impedance is proportional to the resistance of the microphone and the variations of resistance of the microphone produce corresponding variations of impedance. It may be said that the results are the same as if a microphone of very great resistance (of the order of magnitude of the resistance of the generator between the grid and filament), which is found to be more suitable for shunting the grid-filament maintenance circuit of the generator, had been substituted for a microphone of ordinary resistance."

Brit. No. **127,013.** By L. N. Brillouin and G. A. Beauvais.

Consider a valve connected up as shown on Fig. 4. If the positive terminal of v_1 is connected to the grid there will flow a current i_0 between filament and grid and the P.D. between these two electrodes will be:

$$v_0 = v_1 - i_0 r.$$

Let us now vary the value of v_1 by superimposing an harmonic voltage $U \sin wt$. In view of the fact that the characteristic giving the relation between grid-potential and grid-current is not a straight line, the *mean* value

of the grid current will not be the same as in the absence of the superimposed oscillations. A glance at the above equation will show at once that owing to this, the grid potential will also have a mean value different from v_0. It follows that perfectly symmetrical variations of voltage applied between points A and B will result in asymmetrical variations of the grid voltage. Considering now the plate circuit we see that the whole effect of the arrangement is not only an amplification of the applied oscillations, but also to a certain extent their rectification.

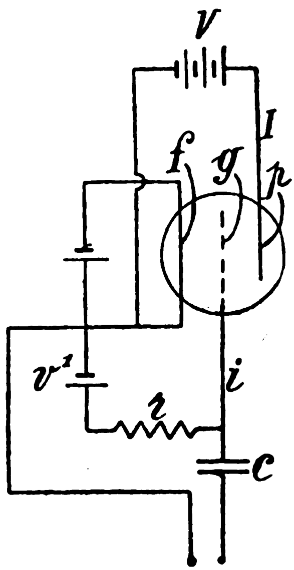


Fig. 4.

It can be shown that while the amplitude of the amplified oscillation is proportional to U (the amplitude of the superimposed oscillation), the rectifying effect is proportional to U^2. Therefore, weak oscillations will be mainly amplified with a very small amount of rectification. On the other hand, for strong oscillations, the rectifying effect will be predominant. By arranging several valves in cascade, both effects can be obtained, for the arriving oscillations will be mainly amplified in the first few valves and then, as their amplitude becomes larger, mainly rectified in the last valves. Such a cascade connection is shown in Fig. 5, where r_1, r_2, r_3, correspond to r in Fig. 4, and R_1, R_2 are resistances in the plate circuits. The P.D.'s across these resistances produced by the plate current variations are applied to the grids through condenser C_2 and C_3. (If these condensers were not introduced, we would have, between grid and filament of the second and third valves, a considerable portion of the voltage of the high tension battery.)

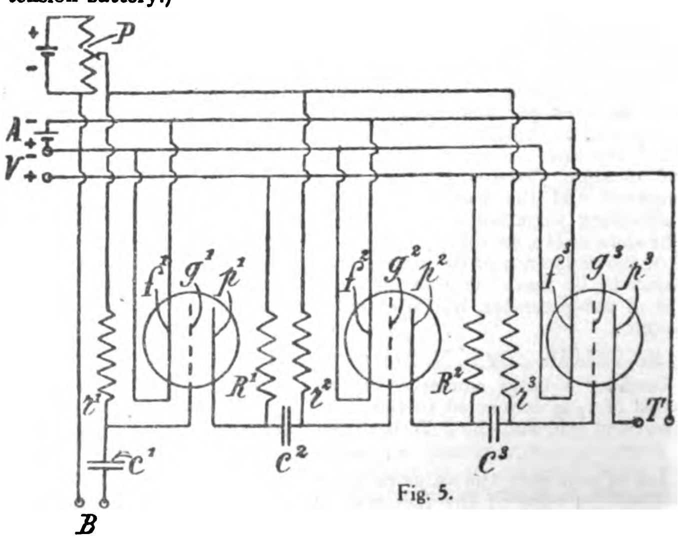


Fig. 5.

Brit. No. **127,014.** By L. N. Brillouin and G. A. Beauvais.

Consider Fig. 5 described in connection with the preceding patent, When the potential of grid g_1 increases, the current in plate circuit $p'R'$ increases. As the voltage of the battery is constant, and in view of the fact that the value of the resistance R' is also constant, an increase in the plate current leads to an increase of the P.D. across R' and, therefore, to a fall in the P.D. between plate p′ and filament f'. It follows that the potential of grid g_2, connected through condenser C_2 to plate p' ,will decrease. The current in plate circuit p^2 R^2 will also decrease and the potential of plate p_2 will therefore increase. Continuing this analysis with respect to all the valves employed for the cascade, we arrive at the general conclusions :

(1) The variations of grid and plate potentials in the same valve are in opposite directions, or, in other words, have a phase difference of 180°.

(2) The potential variations on grids g^k and g_l are out of phase by 180° if $l-k=2n+1$, and in phase if $l-k=2n$, where k and l are numbers indicating the place of a valve (counting as first the one to which the incoming oscillations are applied), and n is an integer. The same rule will apply to the phase difference between the potential variations on any two plates.

(3) The potential variations of grid g^k and plate p_l are opposed if $l-k=2n$, and in phase if $l-nk=2+1$.*

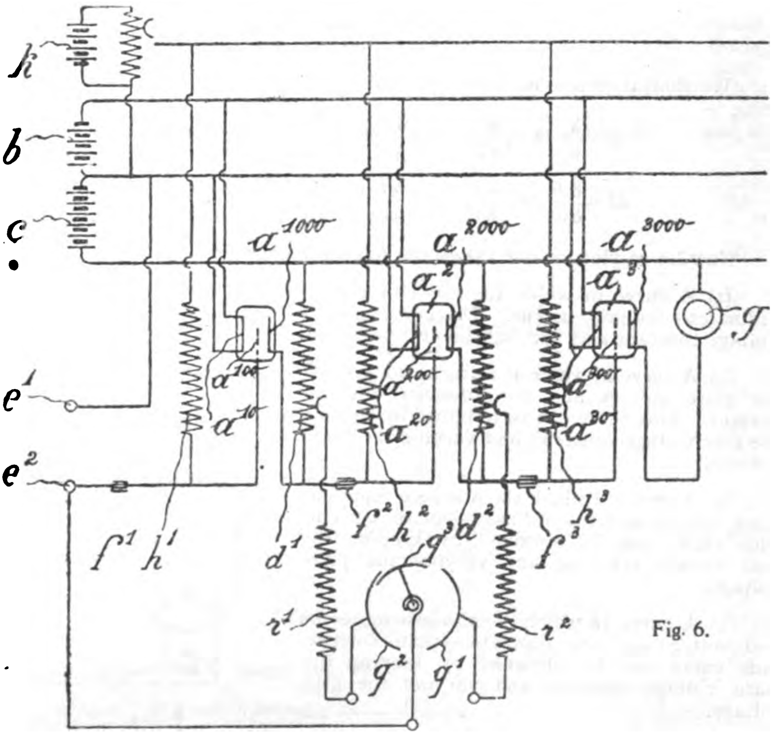


Fig. 6.

* As we shall see further on, these rules are not strictly true owing to the presence of unavoidable impedances in the circuit.

We can utilise these relations for completing the arrangement shown in Fig. 5 by introducing auxiliary connections between the various elements of the several valves as shown, for instance, on Fig. 6. Here adjustable points on the plate resistances d_1 and d_2 of the first and second valves are connected through resistances r_1 and r_2 to two fixed electrodes q_1 and q_2. The moveable electrode q_3, which is so arranged as to form a condenser either with q_1 or q_2, is connected to the grid of the first valve. By moving q_3, we may establish a connection either between a^{2000} and a^{100}, the potential variations of which are in the same phase, or between a^{1000} and a^{100}, the potential variations of which are in opposition. In the first case we shall assist the tendency of the set to generate, and, by regulating the position of q_3, the capacity can be chosen in such a way as to either increase considerably the degree of amplification, or to actually generate oscillations for the purpose of " beat " reception. In the second case, the tendency to generate will be effectively suppressed.

Brit. No. **127,818.** By M. LATOUR.

Taking a valve connected up in the usual manner as shown on Fig. 7, let us denote the grid and plate currents and voltages by i, I, v, V respectively. Since the values of i and I at any moment depend both on the values of v and V at that moment, we may state this dependence in the most general manner by the equations :

$$i = f\ (v,\ V)$$
$$I = F\ (v,\ V)$$

We shall therefore have for any variation of i or I :

$$di = \frac{\delta f}{\delta v}\,dv + \frac{\delta f}{\delta V}\,dV = \frac{\delta i}{\delta v}\,dv + \frac{\delta i}{\delta V}\,dV \quad . \quad . \quad . \quad (1^1)$$

$$dI = \frac{\delta F}{\delta v}\,dv + \frac{\delta F}{\delta V}\,dV = \frac{\delta I}{o v}\,dv + \frac{\delta I}{\delta V}\,dV \quad . \quad . \quad . \quad (2^1)$$

Now let us plot for our valves the following curves :

(1) A curve in which the abscissæ represent the grid voltage and the ordinates—the grid current. This curve can be obtained by keeping the plate voltage constant and varying the grid potential.

(2) A curve in which the abscissæ represent the plate voltage and the ordinates—the grid current. This curve can be obtained by keeping the grid voltage constant and varying the plate voltage.

(3) A curve in which the abscissæ represent plate voltage and the ordinates—plate current. This curve can be obtained by keeping the grid voltage constant and varying the plate voltage.

(4) A curve in which the abscissæ represent grid voltage and the ordinates—plate current. This curve can be obtained by keeping the plate voltage constant and varying the grid voltage.

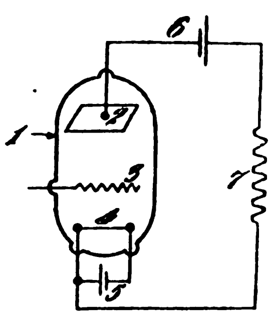


Fig. 7.

By taking the slopes of the four curves at points corresponding to v_0 and V_0 the grid and

plate voltages to which our valve is adjusted, we shall determine, provided the variations in the current are very small, the co-efficients

$$\frac{\delta i}{\delta v}, \frac{\delta i}{\delta V}, \frac{\delta I}{\delta V}, \frac{\delta I}{\delta v}.$$

As the forms of these coefficients suggest, a physical meaning equivalent to conductance, we shall denote them by

$$\frac{1}{r_1}, \frac{1}{r_2}, \frac{1}{r_3} \text{ and } \frac{1}{r_4}.$$

Our equations (1′) and (2′) can now be written in the form :

$$di = \frac{dv}{r_1} + \frac{dV}{r_2} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1'')$$

$$dI = \frac{dV}{r_3} + \frac{dv}{r_4} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2'')$$

Let us further denote the constant E.M.F. of battery 6 by E and the resistance 7 — by R. We shall then have :

$$E = RI + V.$$

For a very small variation of V we obtain :

$$dV + RdI = 0 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3')$$

The physical meaning of the last equation is obvious : since E is constant, any variation of the P.D. across the resistance must be compensated for by a variation in the opposite direction of the P.D. between plate and filament.

Assuming the variation of the grid potential to be harmonic, with a very small amplitude, u, we shall see that the variations of i, I and V also become harmonic with small amplitudes, which we shall denote by j, J and U. Equations 1″, 2″, and 3′ can now be written thus :

$$j = \frac{u}{r_1} + \frac{U}{r_2} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (1)$$

$$J = \frac{U}{r_3} + \frac{u}{r_4} \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (2)$$

$$U + RJ = 0 \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad . \quad (3)$$

By solving these equations for j, U and J, we obtain :

$$\left.\begin{aligned} j &= \left[\frac{1}{r_1} - \frac{r_3 R}{r_2 r_4 (r_3+R)}\right] u \\ U &= -\frac{r_3 R}{r_4 (r_3+R)} u \\ J &= \frac{r_3}{r_4 (r_3+R)} u \end{aligned}\right\} \quad . \quad . \quad . \quad . \quad . \quad (4)$$

The energy amplification can now be expressed, provided R is a pure ohmic resistance without inductance. This will be :

$$\frac{UJ}{uj} = r_1 \left(\frac{r_3}{r_4}\right)^2 \frac{R}{(r_3+R)\left[(r_3+R) - \frac{r_1 r_3}{r_2 r_4} R\right]}$$

This expression is maximum, when :

$$R = R \text{ optimum } = \frac{r_3}{\sqrt{1 - \frac{r_1 r_3}{r_2 r_4}}} \quad . \quad . \quad . \quad . \quad (5)$$

If the resistance, R, instead of being inserted directly in the plate circuit is introduced in a secondary circuit as shown in Fig. 8, equation (3) will have to be written in the form :

$$U + K^2 J R = 0 \quad . \quad . \quad (6)$$

Where K is the ratio of transformation in transformer 6 in the step-down direction. Equation (4) will hold good, however, only in the case of " perfect " transformation—*i.e.*, when the values of the magnetisation current, of the capacity in the windings, of the losses and of the leakage are all zero. In order to approach these conditions as nearly as possible, it is proposed to use the construction shown on Fig. 9. The iron core consists of three limbs. The section of the outer limb is made at least as large as that of the middle limb (*i.e.*, b and $c > a$). By this, the induction in the parts of the core external to the coils is reduced and the losses decreased. Further, the primary Y is sandwiched between the split secondary X and Z. This reduces leakage. In order to reduce the capacity between the windings and the core, a suitable distance is left between them. Lastly, very thin sheets are employed.

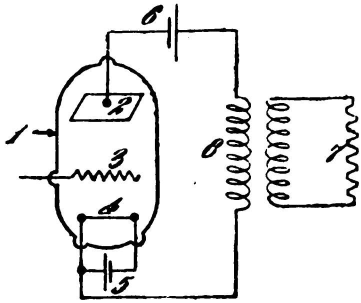


Fig. 8.

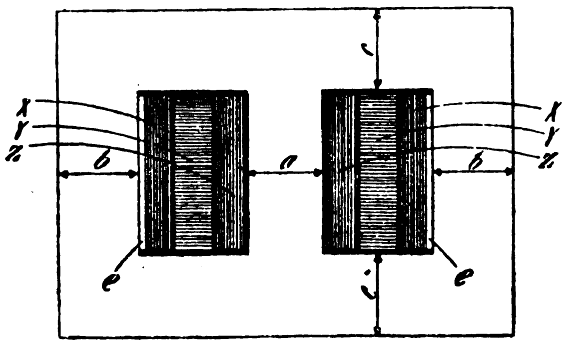


Fig. 9.

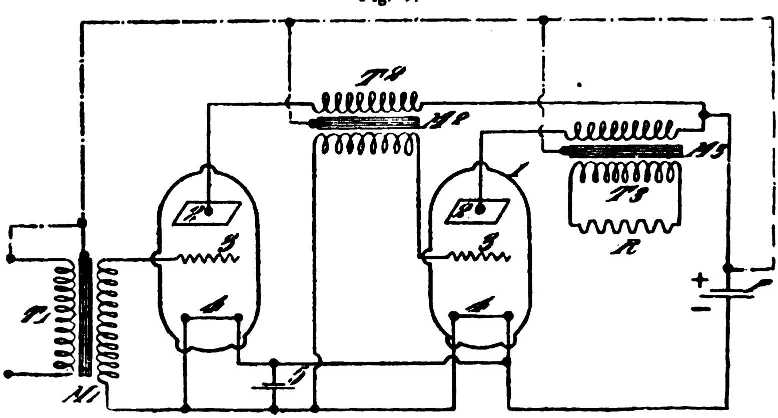


Fig. 10.

Assuming that the precautions just mentioned are sufficient to allow the use of equation (4), we may employ it for the determination of the best ratios of transformations in the arrangement shown in Fig. 10.

Without entering into the details of the calculations we shall only observe that for transformers T^1 and T^2 the loads in the secondaries are given by the apparent resistances of the grid-filament circuit, the value of which from equation (4) is:

$$Y = r_1 \frac{r_3 + R}{(r_3 + R) - \frac{r_1 r_3}{r_2 r_4} R}$$

It will be observed that all the iron cores are connected to one pole of the H.T. battery P. The reason for this is explained by the inventor as follows:

A particular phenomenon which is produced in the lamp relays is that of priming due to static phenomena. This may be prevented by properly arranging the potential of the cores of the transformers and, if necessary, that of their windings, as well as that of the primary coil of the transformer T_1, with relation to the battery P. To this end, it suffices to connect the abovementioned cores, which may be represented by M_1, M_2, M_3, and a primary terminal of the transformer T_1, to any point of the battery P, either to the positive pole or the negative, or to an intermediate cell, as shown in dot and dash lines in Fig. 10.

Brit. No. **127,651.** By MARCONI'S WIRELESS TELEGRAPH CO., LTD., and G. M. WRIGHT.

The specification covers a method of connecting several valves in cascade for the purpose of obtaining a high degree of amplification. The method is illustrated in Fig. 11, where LC is the circuit affected by the incoming weak oscillations, p is a potentiometer for adjusting the potential of grid g, f and a are the filament and anode, r a high resistance, and H the H.T. battery. The variations of the grid potential due to the incoming signals will result in amplified variations of the anode potential, for since the voltage of the battery H is constant, the variations in the plate current lead to a variable P.D. across the resistance, r, causing thereby a variation of the plate potential. Now, if the grid and filament of the next valve were connected across the resistance r, we would have a high potential (say, half of the battery H if the resistance of r is equal to that of the path between f and g) applied to the grid even during the intervals when no signals are impressed on circuit CL.

According to the present specification, therefore, the filament of the second valve is connected to an intermediate point, m, of H. We can choose m in such a manner that the P.D. between it and point n should be, in the absence of signals, zero, or very small. Owing to this, only *variations* of the plate potential of the first valve will be impressed on the grid of

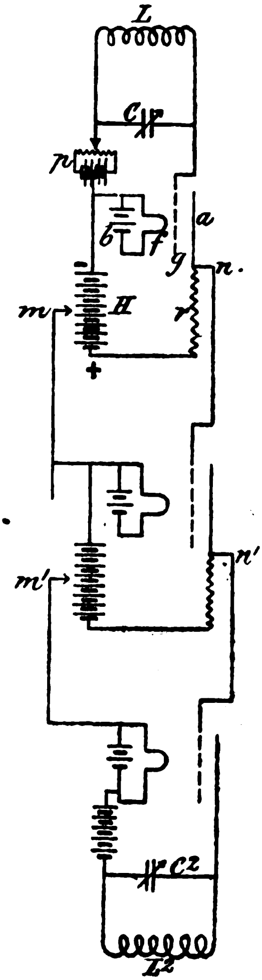


Fig. 11.

the second. Points *m'*, *n'*, are connected to the filament and grid of a third valve and the amplified variations are impressed on the output circuit C_2L_2. It is, of course, clear that more than three valves could have been employed. The arrangement is specially advantageous where the amplification of very slow variations is desired, as, for instance, in cable telegraphy. The usual method of connecting the grid and filament of one valve across the resistance in the plate circuit of the preceding one through a condenser, would be inapplicable in this case. It is also clear, for the reasons given in connection with No. 129,313, that the arrangement described here will work as a limiting device both against negative and positive impulses beyond a certain strength.

Brit. No. **127,724.** By W. H. Edmundson, W. T. Munro, and the British Thomson-Houston Co., Ltd.

In order to protect the seal of a valve from the destructive action of the heat radiated from the anode during operation, it is proposed to employ a shield arranged as shown on Figs. 12 and 13, which illustrate the end and side elevations of the stem carrying the electrodes of a valve. The filament 2 is here placed along the axis of the cylindrical anode 3. Concentrically with the

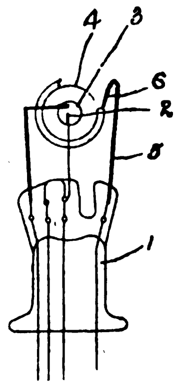


Fig. 12.

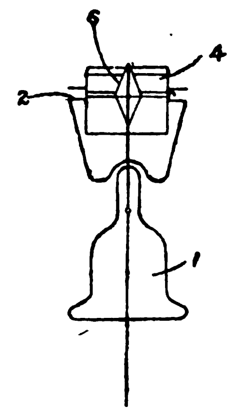


Fig. 13.

latter is arranged the shield 4, which is made by doubling a thin sheet of metal and bending it in such a manner as to form two co-axial cylinders. The shield is secured to the supporting wire 5 by the tongue 6, stamped from the sheet.

It is claimed that this arrangement, besides screening the seal from the direct radiation of heat from the anode, will also eliminate the bridges sometimes formed between the leading-in-wires by the deposition of the conducting material disintegrated from the electrodes.

Brit. No. **128,383.** By N. Lea.

The specification covers an arrangement which allows of utilising the oscillations generated by a valve for measuring the length of continuous waves by the heterodyne method. The connections are shown on Fig. 14, where the inductance 3, shunted by a variable condenser 11, is introduced in the plate circuit, which also contains a telephone, 15, shunted by a condenser, 13, and a battery, 5. The latter serves also for heating the filament through a resistance, 7. The necessary "reaction" is provided by the grid coil, 8, which is in inductive relation with coil, 3. The length of a continuous wave

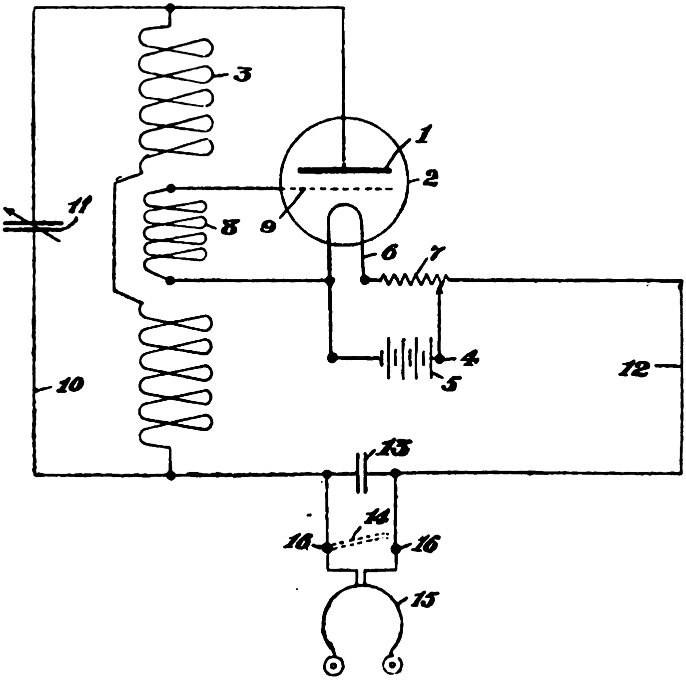


Fig. 14.

can be measured by causing it to interfere with the wave generated by the valve. The interference note is received in the telephone, 15. The capacity of condenser, 11, is then varied until the note disappears. At that moment the frequencies of the waves to be measured and that generated by the valve cannot differ by more than the frequency of the lowest audible note. Of course even this uncertainity can be eliminated by varying condenser, 11, until a note is obtained, which is then measured by acoustic means. It will be seen that by calibrating condenser, 11, the length of the interfering wave can be read off at once.

Brit. No. 128,673. By Marconi's Wireless Telegraph Co., Ltd., and C. S. Franklin.

The specification covers a method for receiving very short continuous waves, and is set forth very clearly by the inventor as follows :—

" Assuming 30,000,000 to be the frequency received, then the local oscillator must give a frequency of 30,001,000 or 29,999,000 in order to give an interference note of 1,000. Should either frequency vary one-hundredth of one per cent., the interference note may change from 1,000 to 4,000. Practically, when working with frequencies of this order the interference note varies so rapidly and to such an extent with the small variations of frequency which take place that the signals are unreadable."

" According to this invention, we vary the frequency of the local oscillations by a small percentage regularly and in a continuous manner. This may be done by arranging in the local generator a condenser which consists partly of segments arranged on a rotating disc or cylinder, so that the capacity varies continually between two limits. Alternatively, the condenser may be made of two plates, one or both of which is or are supported on a vibrating reed. Or again, a continually varying inductance may be employed, or a combination of these."

" A receiver constructed according to this invention works as follows :—

" Assuming the received frequency to be 30,000,000 and the local generator arranged to give a 30,000,000 frequency with variations of a half per cent. above and below this, 1,000 per second. During reception an interference note is produced which varies from zero to a frequency of 150,000. An audible sound is produced in the telephone only during the time that the interference note is varying through the range from about 8,000 to zero and back to 8,000, that is to say, while the interference note is within audible limits. The period occupied by this range is so short that only a "click" occurs in the telephone for every variation between the above limits of the frequency of the local oscillator. As, however, this variation occurs 1,000 times per second, a clear note having a frequency of 1,000 per second is heard whenever signals are received.

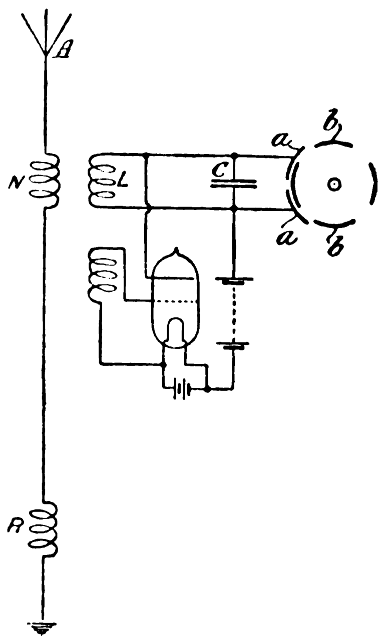


Fig. 15.

" We thus obtain a receiver for short waves which has the great sensitiveness of the interference receiver, but is independent of very small variations in frequency either in the received waves or in the local oscillator.

" Our invention is illustrated by the accompanying diagram (see Fig. 15), in which *A* is an aerial in series with two coils, *N*, *R*, the latter forming part of the receiver, which is not shown, and which may be either a crystal or valve receiver. Coupled to the coil *N* is a coil *L* in series with a condenser *C*, in parallel with which latter is a variable condenser formed of two strips, *a*, *a*, and segments, *b*, *b*, carried upon a disc or cylinder, which can be rapidly rotated. The capacity of the circuit *L*, *C*, *a*, *a*, depends upon the position of one of the segments *b* relative to the strips *a*, *a*, and varies between a maximum and minimum as the segments *b* pass the strips."

Brit. No. **129,051.** By Edison Swan Electric Co., Ltd., C. E. Hiatt, and W. J. Davis.

The anode of a valve is usually supported by a metallic rod, to which it is electrically welded. Besides being expensive, the process of welding, which has to be carried out in an atmosphere of hydrogen, causes the anode to absorb a certain amount of gas. In order to obviate these disadvantages the present specification proposes to form the supporting rod as an integral extension of the curved anode. The invention is illustrated in Fig. 16, where 1 is a cylindrical anode provided with an extension, 2, which is sealed in the glass stem, 4, and connected directly to the leading-in wire 3.

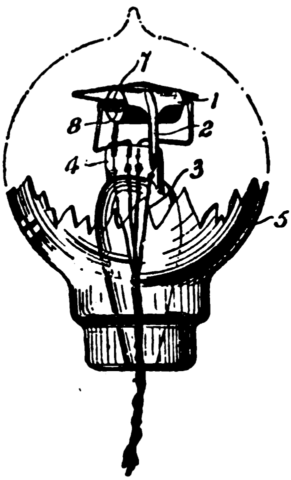


Fig. 16.

Brit. No. **129,313.** By the British Thomson-Houston Co., Ltd. (A communication from the General Electric Co., U.S.A.)

Consider the cascade arrangement of amplifying valves shown on Fig. 17, in which 3, 4, 5, 6, are valves, 13, 14, 15, high resistances in the plate circuits, 23, 24, 25, high resistances in the grid circuits, and 17, 18, 19, condensers which prevent the potential of battery 7 from being applied between the grids and filaments of the valves, while not interfering at the same time with the amplified variations of potential. It will be seen readily that the arrangement does not differ from the one shown on Fig. 5.

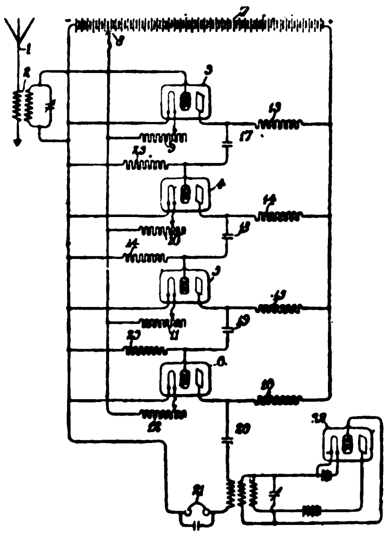


Fig. 17.

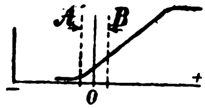


Fig. 18.

The analysis given in connection with that figure in the note on No. 127,014 will therefore hold good here. A rise of the potential applied to grid 3 will lead to a fall on grid 4, a rise on grid 5 and a fall on grid 6. Let us now assume that valve 5 is so adjusted as to be limiting in one direction, as shown, for instance, on Fig. 18, where the curve is the well-known grid voltage-plate current characteristic and the lines *A* and *B* indicate the limits between which the grid potential is made to vary by the signal amplified in the valves preceding the one under consideration. It will be seen that a strong negative impulse will not be magnified by the valve to a greater amplitude than that of the signal. On the other hand a positive impulse may result in a much larger amplitude than the signal. However, as explained above, an increase in the plate current of valve 5 will lead to a *fall* of potential on the grid of valve 6. But the variation in the plate current of the latter is limited on the negative side, therefore the amplitude of the current variation in plate 6, caused by a strong positive impulse on grid 5, will be no larger than that due to a negative impulse and cannot be amplified to a greater strength than that of the signal.

The present specification proposes to utilise this property for reducing the interference due to atmospherics. From the above explanations it will be clear that by properly adjusting the valves the strength of a stray can be made never to exceed that of a signal. As to the manner in which the necessary limiting value can be obtained, the adjustment of the filament current seems to be the most convenient.

Brit. No. **130,039.** By G. A. Beauvais.

In order to drive out the gases occluded in the anode of a valve, it it customary to bring it to a high temperature during the process of exhaustion by the bombardment of electrons emitted from the filament. The latter has, therefore, to be made of a comparatively large section, for otherwise it may be damaged by the heavy current which is required during the last stages of evacuation. A valve with a thick filament implies, however, a large heating current during operation.

The present specification proposes to obviate these difficulties by providing the grid with two terminals instead of the usual single one, and employing it as a source of electrons for bombarding the anode. As there is no objection to making the grid of a thick wire, the heating current during exhaustion may be large for obtaining a sufficiently copious emission which will allow of freeing the anode quickly and efficiently from the gases occluded in it. At the same time, the filament may be made very thin. This will reduce its consumption during operation and enable primary batteries to be used as a source of supply.

The invention is illustrated on Fig. 19, where *a*– is the filament, *b*– the grid and *c*– the anode. The two terminals C_1 and C_2 of the grid allow of connecting it to a source of current for heating during manufacture. The terminals may also be employed for causing, by means of a suitable current, a fall of potential along the grid, which may be so chosen as tc maintain a desired P.D. between the grid and filament throughout their entire length.

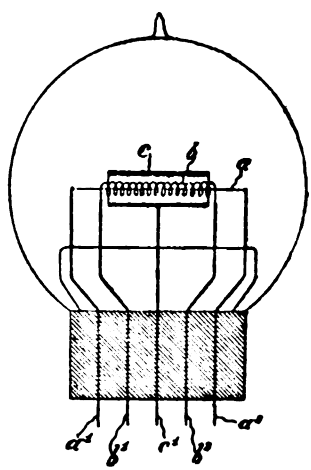


Fig. 19.

Brit. No. **130,219.** By the WESTERN ELECTRIC Co., LTD.

The specification covers an arrangement which allows of suppressing the radiation of a H.F. wave as long as it is not modulated by the voice or in any other way.

The invention is illustrated on Fig. 20, where 40 is a source of H.F. oscillations coupled by transformer 41 to circuits 1—8—12—3 and 2—8—13—4. It will be seen that at any moment the potentials impressed by 40 on grids 3 and 4 will be equal in magnitude and sign. Owing to this the current variation in the plate circuits 5—46—17—1 and 6—47—17—2 are equal in

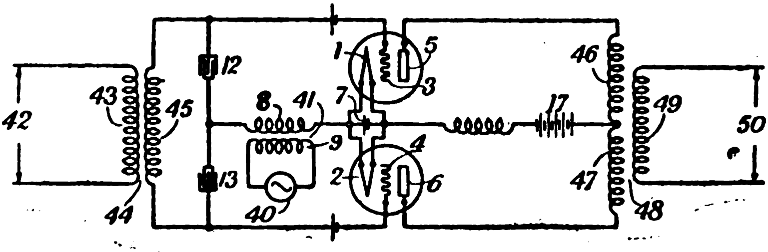


Fig. 20.

magnitude, but they will oppose each other in coils 46 and 47, which are wound in the same direction, with the result that no current will be transmitted to the output circuit 50. As soon, however, as current variations of any character are caused in circuit 42, connected to the modulator (which is not shown), voltage-variations of opposite sign will be impressed on grids 3 and 4, which are connected to the terminals of secondary 45. The currents in the plate will not balance each other as before, and modulated oscillations will therefore be transmitted to circuit 50.

Brit. No. **130,400.** By the BRITISH THOMSON-HOUSTON Co., LTD. (A communication from the G.E.C. of America.)

The specification covers a method for utilising the "dynatron" for the amplification or the production of oscillations with an amplitude modulated in accordance with speech. For a detailed description of the "dynatron" the reader is referred to the YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY, of 1919, p. 948, No. 114,539. Here we need only say that the device is similar in construction to the ordinary three-electrode valve, which is, however, connected in such a way as to maintain both the grid and the plate at a positive potential. When the plate potential is small in comparison with that of the grid almost all the electrons emitted from the filament go to the grid. As the potential of the plate is increased it is struck by more and more electrons which escape through the grid. Moreover, the velocity of the electrons arriving at the plate will depend on its potential. When the latter reaches a certain value electrons begin to be liberated from the plate, owing to the impact of the electrons attracted to it through the grid. With the further increase of the plate potential the amount of liberated "secondary" electrons becomes larger, and as they are attracted by the grid (owing to its being positive) a current opposing the primary one, caused by the electrons moving from grid to plate, is established. It will be seen that after a certain value an increase in the plate potential results in a fall of the plate current, i.e., the device will possess a falling characteristic. It will also be obvious that the action of the device, whether used for amplification or generation, can be controlled by regulating the number of primary electrons which are allowed to strike the plate. The method proposed for this purpose

in the present specification consists in the modification of the path of the electrons by means of a magnetic field. Let, in Fig. 21, 2 represent the filament, 5– the grid wires and 8– the cylindrical anode. The paths of the electrons emitted from 2 will then be given by the dotted straight lines 10 which end on the grid, and 11 which end on the plate. If, however, the device is placed in a magnetic field, the lines of which are parallel to the filament, the paths of the electrons become curved, as shown on Fig. 22. As the field is made stronger the curves contract towards the filament, and at last a stage may be reached when none of the electrons emitted from the filament will be able to escape from the space surrounded by the grid.

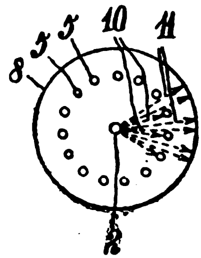


Fig. 21.

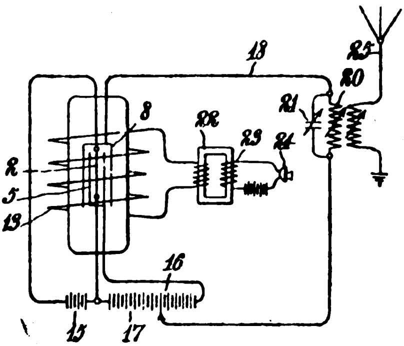


Fig. 23.

This effect of the magnetic field can be utilised for control by speech as indicated, for instance, on Fig. 23. Here 2 is the filament heated by battery 15, 2– is the grid, connected to the positive terminal of the H.T. battery 17, and 8– is the plate, connected to an intermediate point of battery 17 in order to maintain it at a positive potential lower than that of the grid. If the device is properly adjusted oscillations will be generated in circuit 20– 21, which will be transmitted to the antenna 25.

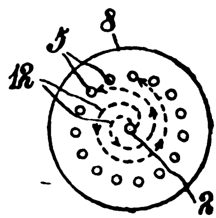


Fig. 22.

In order to modulate the amplitude of these oscillations by the voice, the microphone 24 is connected through a transformer 23– 22 to coil 13, arranged co-axially with plate and grid. When the microphone is actuated a variable current will flow in coil 13, causing a magnetic field of variable strength. This will modify to a greater or smaller extent the paths of the electrons emitted from 2, and thereby vary the number of electrons reaching the plate, which will again lead to a variation in the amplitude of the generated oscillations.

Brit. No. **130,408.** By L. B. Turner.

It is well known that for a given value of mutual inductance between the plate and grid circuits of a generating valve oscillations will be set up only if the grid potential is such that the corresponding slope of the characteristic exceeds a certain magnitude, determined by the values of the circuit constants. If the valve is adjusted to a point just below this threshold value of the slope, an increase of the grid potential due to any disturbance (*e.g.*, a signal) will

start oscillations, which will go on even after the disturbance has ceased. With the setting in of oscillations the mean value of the anode current will considerably increase, and it may be made to reach a value sufficiently large for energising the electromagnets of a relay. The latter may be made to close a local circuit containing some kind of calling or recording device. An arrangement based on the above principles is shown in Fig. 24. The vale *V* contains as usual an anode *A*, a grid *G*, and a filament *F*, heated by the battery B_f. The signal is impressed upon the grid through transformer T_p, T_s, and the threshold value of the slope is adjusted by a suitable choice of the constant grid potential as determined by the position of the adjustable contact on battery B_g. The grid circuit contains an inductance, I_g (which may be shunted by a condenser, C_g), by means of which it is coupled to the anode circuit. The latter contains, besides the usual H.T. battery, B_a, and the oscillating circuit, I_a C_a, also the electromagnets *CR* of a relay. The operation is as follows :—

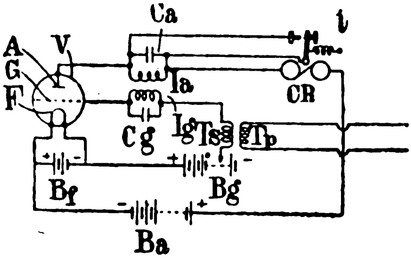


Fig. 24.

The grid potential is adjusted just below the critical value which is necessary for the possibility of oscillations. This value will depend on the degree of coupling between I_a and I_g and the constants of circuits I_a C_a and I_g C_g. When a signal of sufficient strength causes the grid potential to rise above the critical value oscillations set in. The anode current, which was too small before, reaches now a value which is sufficient for energising the electromagnets *CR* to such a degree as to pull over the tongue *t* from the right-hand contact, against which it is usually held by a spring, to the left-hand one, closing thereby a local circuit. At the same time, however, in its new position the tongue *t* short-circuits the condenser C_a and inductance I_a. Owing to this the interaction between the plate and grid circuits is upset and the further generation of oscillations stops. The anode current becomes again too weak, and the spring pulls back the tongue, *t*, to its initial position. The grid potential sinks again below the critical value, and the apparatus is ready for the next signal.

Brit. No. 131,553. By the BRITISH THOMSON-HOUSTON CO., LTD. (A communication from the G.E.C. of America.)

The specification describes a wireless telephony transmitter as shown on Fig. 25. The generating valve, 1, the amplifiers, 20, 21, 22, and the modulating valve, 31, have all a common source, 17, for heating their filaments, and a common battery, 14, for maintaining a convenient P.D. between the grids and filaments. Valves 1, 20, 21, 22, have also a common high-tension source, 7, for their plate circuits (the inductance, 10, and condenser, 11, are provided in order to smooth out any irregularities in the supply current). Choke coils, 12, 43, and 18, protect the generators, 7 and 17, from H.F. currents, while choke coils 15, 26, 33, do the same service with regard to battery 14. All these choke coils are so designed that their inherent capacity will, together with their inductance, give a natural period equal to that of the H.F. oscillations generated by the valve. Owing to this, their impedance, and, therefore, their choking action, will be very high with respect to these oscillations.

Considering now the generating circuits, it will be seen that the necessary

"reaction" is effected by connecting an intermediate point, 13, of inductance, 5, to the filament. Condenser 9 is necessary in order to obviate the short-circuiting of generator 7 (by the path 10-12-5-13-2-8). Condenser 16 protects battery 14 from short-circuiting (by the path 4-13-8-earth-14-15-4). The oscillations generated are impressed by means of transformer 5-19 between the grids and filaments of the amplifiers 20, 21, and 22 connected in parallel. The condenser 24 is necessary in order that battery 14 may not be short-circuited (by the path earth-14-26-25-19-8-earth). The resistance 25 is introduced in order to suppress the tendency of the amplifying system to oscillate with an audio or radio frequency, owing to the coupling between their electrodes caused by the internal capacity of the valves. The amplified oscillations are imparted to the antenna, 30, through condenser 27, which removes the possibility of short-circuiting generator 7 (by path 7-10-43-28-earth-8-7). It will be noticed that point 28 is adjustable. This is necessary in view of the fact that the efficiency of an amplifier is highest when the im-

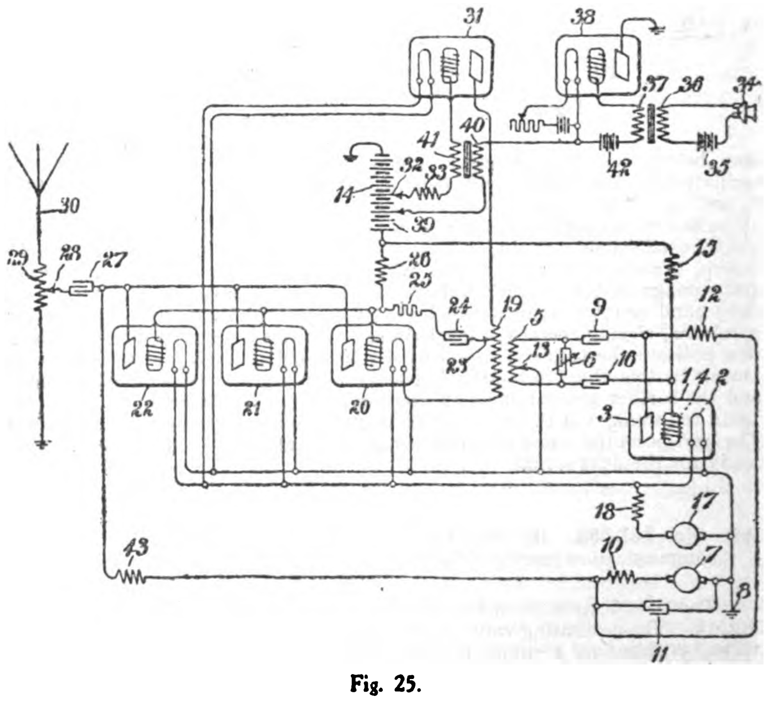


Fig. 25.

pedance of the load circuit has a particular value depending on the characteristics of the valve. If the antenna does not happen to possess that optimum value of impedance, an adjustment is possible by moving point 28 along inductance 29.

Thus far we have described an arrangement for generating in the antenna of oscillations with a uniform amplitude. In order to modulate the radiated energy in accordance with the speech, the coil 19 is shunted by the plate filament of valve 31, and the resistance of this path is made to depend on

potential variations caused by the microphone, 34. It is clear that when the grid of valve 31 is highly negative the resistance of the space between its filament is very high, and the potential impressed by the secondary 19 on the grids of the amplifiers is very nearly the same as if there were no shunt at all. On the other hand, when the grid of valve 31 increases, the resistance of the shunt goes down and the potential variations on the grids of the amplifying valves will decrease, reducing thereby the output delivered to the aerial. How the current variations in the microphone circuit, 34-35-36, on being amplified by valve 38, are made to affect the grid potential of valve 31 is perfectly clear from the drawing. It may be only added that the plate circuit of valve 38 is: plate-earth-14-39-40-filament.

Brit. No. **131,680.** By A. G. BLOXHAM. (A communication from the Russische Aktien-Gesellschaft L. M. Ericsson and Company.)

With the usually employed filamentary cathode for valves, the P.D. between it and the grid varies from point to point owing to the fall of potential caused by the heating current. The present specification proposes to provide the valve with an additional electrode which will serve as a secondary source of emission when subjected to bombardment by the electrons emitted from a heated filament. The construction is illustrated on Fig. 26, where *c* is the anode, *b* the grid, and *a* an electrode exposed to the discharge from filament *d*. The temperature of *a* is thereby sufficiently raised to cause it to emit electrons, which are utilised in the usual manner for generating, amplifying or detecting oscillations. It will be seen that the P.D. between *a* and *b* will now be uniform over the whole of their areas. Apart from this, the construction allows also of bringing *a* and *b* very near to each other.

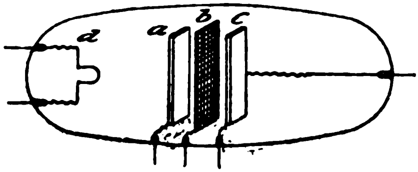
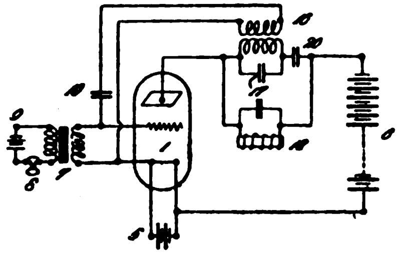


Fig. 26.

Brit. No. **132,118.** By M. LATOUR.

The specification describes an arrangement in which the same valve is employed for generating H.F. oscillations as well as for amplifying the microphone currents. The connections are shown on Fig. 27, where 1 is the generating valve, the plate circuit of which is made to control the grid potential through the H.F. transformer 16. At the same time the L.F. variations impressed on the grid by microphone 8 through the iron-core transformer 7 are amplified in the L.F. plate circuit which contains the impedance 18. The potential variations at the terminals of the latter are impressed on the plate. The amplitude of the oscillations generated by the valve will thus be modulated in accordance with speech. The capacities 19 and 20 are so inserted as to render the impedance of the H.F. circuits very high for L.F. currents.


Fig. 27.

Brit. No. 133,181. By the EDISON SWAN ELECTRIC CO., LTD., and C. E. HIATT.

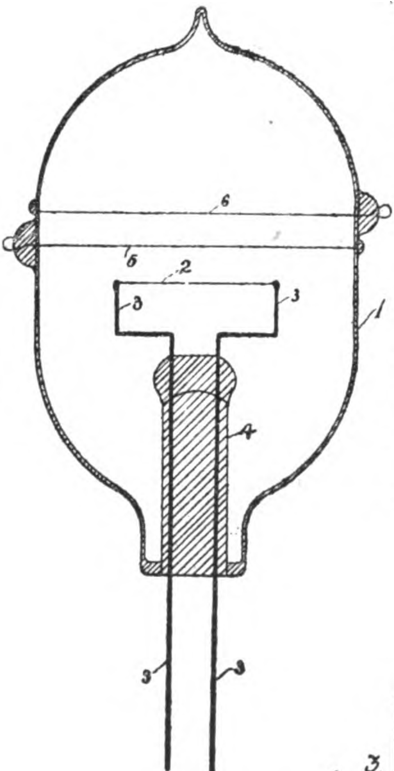


Fig. 28.

The specification covers the construction of a valve as shown on Fig. 28, where the grid 5 and anode 6 are formed by wires stretched across the tube and fused at their end in the glass of the bulb. Besides the simplicity of construction, the inventors also claim for the valve a reduced internal capacity.

Brit. No. 133,366. By the WESTERN ELECTRIC COMPANY, LTD.

The specification describes an arrangement for modulating by the voice the amplitude of the oscillations generated by a valve. In Fig. 29 the latter is represented by 1. The plate circuit is formed by 4—2—9—8—16—1. In parallel to inductance are connected condenser 5, inductance 13 and con-

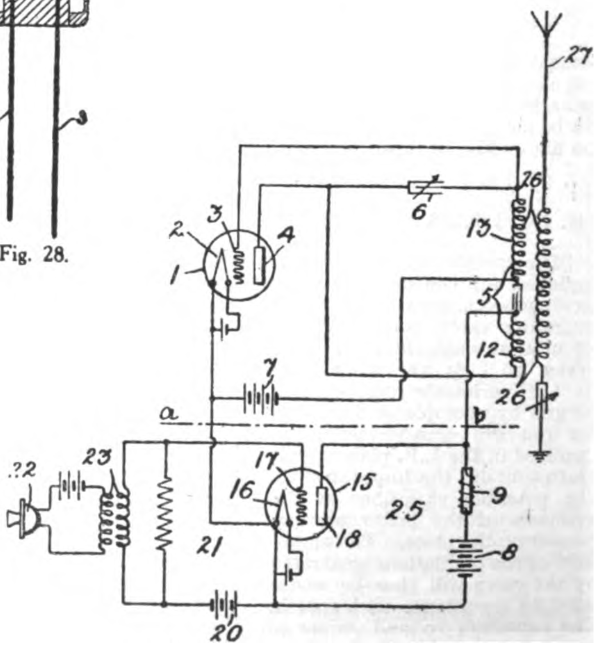


Fig. 29.

denser 6, so that 12—5—13—6 form an oscillating circuit. The grid circuit is formed by 3—13—7—1. The battery 7 serves for maintaining the grid at a convenient constant potential. Since coil 13 is common to both the plate and grid circuits, the so far described arrangement will freely oscillate, causing the aerial 27 to radiate continuous waves. For the purpose of modulating the amplitude of these waves by speech, the coil 9 and battery 8 are shunted by the filament plate of valve 15. Between the grid and filament of the latter is connected the secondary of transformer 23, the primary of which contains the microphone 22. The operation of the arrangement is explained by the inventors as follows :—

" In the drawing, consider that part of the system containing the output circuits of both tubes. We may assume for explanation purposes that battery 8, choke coil 9, and the impedance between the filament 2 and plate 4 constitute the main circuit, with the impedance between filament 16 and plate 18 acting as a resistance shunted around said battery and choke coil. This latter named resistance is not constant in value, since the negative grid voltage of tube 15 undergoes variations according to the low-frequency oscillations that are impressed on its input terminals. For illustration, consider the instant at which grid 17 has been made more negative by the impressed signals. This will tend to increase the impedance between filament 16 and plate 18, and so decrease the current flowing through the element 15 from battery 8. The choke coil will then have an electromotive force induced in it, due to this change in the current value, which electromotive force will tend to keep the current constant so that more current will be sent through the part of the circuit containing filament 2 and plate 4 on account of the increase of the impedance between the output electrodes of tube 15. In a like manner, a decrease in the latter-named impedance will produce a corresponding decrease in the current between the output electrodes of tube 1. Hence variations in the current through the input circuit of tube 15 will produce a like variation in the current of the output circuit of the tube 1; that is, the voltage supplied to the oscillation generator will be modulated in accordance with the signal wave form impressed on the input circuit of the modulating tube."

" In the above description the element 9, although shown as a choke coil, may equally as well be considered as an auto-transformer in which the primary and secondary windings are equal and united. The operation of the system is the same in both cases."

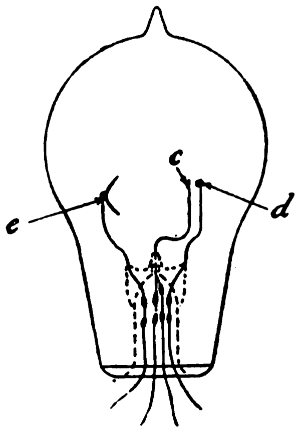


Fig. 30.

Brit. No. **133,413.** By J. Erskine-Murray, D.Sc.

A valve possessing a characteristic differing from the usual is obtained by arranging the filament between the plate and grid as shown on Fig. 30, where *e* is the anode, *c* the filament, and *d* the grid. It will be seen that, owing to this arrangement of the electrodes, an increase in the potential of the grid will cause a portion of the electrons emitted from the filament to be attracted to the grid, thereby causing a decrease in the plate current. On the other hand, a decrease in the grid potential will send more electrons to the anode, and the plate current

will increase. The grid-filament and plate-filament currents are shown as functions of the grid potential on curves *a* and *b* of Fig. 31.

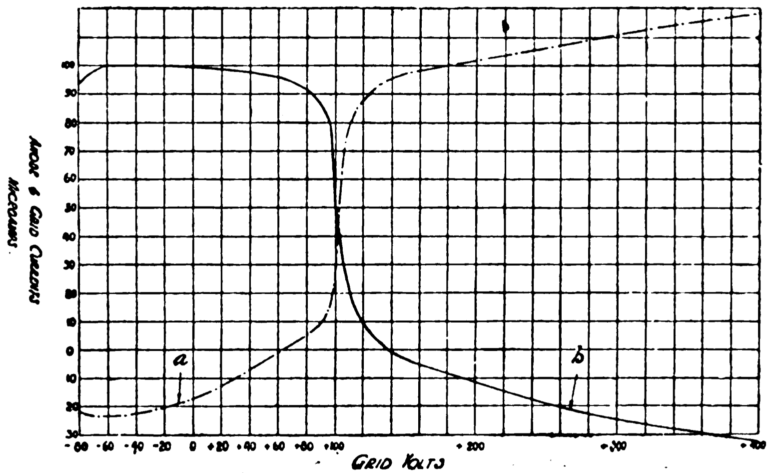


Fig. 31.

Brit. No. **134,725.** By C. D. Ehret.

The specification describes a method of controlling the energy in the output circuit of a 3-electrode valve used for generation or amplification. In Fig. 32, *a* is the valve with the plate *w*, grid *g* and filament *f*, heated by the battery *c*, connected in series with the microphone *m*, the adjustable resistance *r* and the primary p_1 of a transformer, the secondary s^1 of which is connected in series with the H.F. generator S and battery *b* between grid and filament. It will be seen that normally the oscillations impressed between grid and filament by the source S will be reproduced with an amplified and uniform amplitude in the plate circuit. As soon, however, as the microphone is actuated, there will be impressed upon the grid through the transformer $p_1 s_1$ a variable potential in accordance with the variations of the microphone resistance due to the voice. Moreover, the current fluctuations in the microphone circuit will also lead to variations in the temperature of the filament, causing thereby variations in the plate current. It follows from the above that the amplitude of the H.F. oscillations in the plate circuit will be modulated by the microphone in a twofold way, by varying the grid potential and also the filament current.

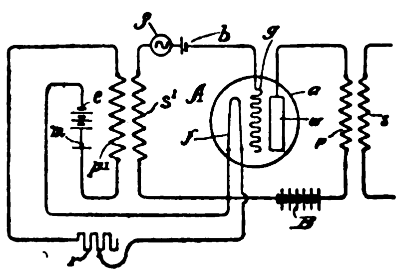


Fig. 32.

BRITISH PATENT SPECIFICATIONS PUBLISHED DURING 1919

Specification No.	Date of Application.	No. of Application.	Name of Inventor.	Subject.
1,402/1915	28/1/15	—	E. R. Clark	Wireless apparatus.
7,750/1915	25/5/15	—	R. T. Glazebrook and W. Duddell	Direction finder
12,869/1915	8/9/15	—	Western Elec. Co., Ltd.	Microphones
116,088	8/5/18	7,718	A.E.G.	H.F. dynamo-electric machines
117,443	1/5/18	7,314	R. Bosch A.-G.	Double-current dynamos
118,600	25/6/18	10,477	Naamlooze Teleph. Co.	Wireless telegraphy and telephony
120,198	19/8/18	13,455	Svenska Co.	Hammer interrupters for W.T.
120,570	21/10/18	17,174	L. M. Cockaday	Wireless telegraphy
120,888	26/10/18	17,513	Soc. Franc. Radio-Elec.	Dynamo-electric machines: Wireless telephony
121,144	14/9/17	13,225	W. J. Lyons	Harmonic telegraph receivers
121,220	22/4/17	1,942	C. J. Blue	Vacuum tubes
121,500	14/11/17	16,717	B.T.H. Co., Ltd.	Changing frequency of A.C.
121,627	27/11/17	17,529	B.T.H. Co., Ltd.	Röntgen-ray tubes
121,878	20/3/18	4,933	B.T.H. Co., Ltd.	Röntgen-ray tubes
123,081	1/2/19	2,585	C. D. Ehret	Transmitting apparatus
123,126	8/1/18	411	Western Elec. Co., Ltd.	Vacuum tubes
123,308	30/1/19	2,393	Bosch Magneto Co.	Electric condensers
123,346	29/11/17	17,673	G. Plaisant	Electro-magnetic fabrics
123,583	26/2/18	3,433	L. Rouzet	Elec. inductances: transformers
123,734	14/2/19	3,712	E. Girardeau	H.F. generators
124,138	18/7/18	11,804	G. M. Wright	Wireless signalling
124,320	6/5/18	7,597	F. Woods	Elec. couplings: eyelets
124,498	7/2/16	1,827	C. L. V. Lee and B. Binyon	Reels and reel-carriages for aircraft aerials
124,499	11/2/16	2,066	E. R. Clarke	Wireless telegraphy
124,506	17/2/16	2,402	A. Artom	Wireless signalling
124,786	27/3/16	4,518	A. Artom	Wireless signalling
124,833	2/5/16	6,256	J. Hettinger	Wireless signalling
125,201	6/4/18	5,917	B.T.H. Co., Ltd.	Vacuum elec. discharge apparatus
125,276	13/6/18	9,745	B. P. Romain	Elec. frequency meters
125,373	26/10/18	8,179	Soc. Franc. Radio-Elec.	H.F. alternator
125,478	24/8/16	12,033	J. St. V. Pletts	Wireless telegraphy
126,019	26/10/16	15,274	J. Bethenod	Producing elec. oscillations
126,030	31/10/16	15,547	Soc. Franc. Radio-Elec.	Wireless signalling
126,045	14/11/16	16,265	A. Ryan	Improvements in masts and the like
126,146	6/5/18	7,596	I. Shoenberg	Producing H.F. oscillations
126,381	22/1/17	1,050	T. Harvey	Elec. signalling apparatus
126,658	23/10/16	15,072	M. Peri and J. Biguet	Vacuum tubes
126,859	12/7/18	11,485	K. Ohtani	Sealing conductors into elec. lamps
126,978	21/2/16	2,598	E. Bellini	Wireless signalling
127,008	29/1/17	1,460	Soc. Franc. Radio-Elec.	Wireless telephony
127,013	22/2/17	2,656	G. A. Beauvais and L. N. Brillouin	Wireless telegraphy
127,014	22/2/17	2,657	G. A. Beauvais and L. N. Brillouin	Wireless telegraphy: telephone relays
127,313	13/4/17	5,252	A. H. Bagnold, G. Johnson, and F. G. Goldstone	Variable inductances
127,318	16/4/17	5,363	M. Latour	Relays: amplifying apparatus
127,325	19/4/17	5,519	B.T.H. Co., Ltd.	Wireless signalling
127,335	24/4/17	5,738	B.T.H. Co., Ltd.	Wireless signalling
127,434	24/6/18	10,412	B. Binyon	Aerial for aeroplanes
127,488	2/10/18	17,319	A. Young	Generation of H.F. currents
127,634	5/5/17	6,433	I. Shoenberg	Thermionic devices for W.T.
127,651	12/5/17	6,794	G. M. Wright	Thermionic devices for magnification
127,669	19/5/17	7,254	S. G. Brown	Telephone receivers: relays
127,675	23/5/17	7,427	B.T.H. Co., Ltd.	Aerials for W.T.
127,724	6/6/18	9,346	H. W. Edmundson, W. T. Munro, and B.T.H. Co., Ltd.	Vacuum elec. discharge device

BRITISH PATENT SPECIFICATIONS PUBLISHED DURING 1919 (*continued*).

Specification No.	Date of Application.	No. of Application.	Name of Inventor.	Subject.
128,254	3/7/17	9,595	M. Latour	Vibrator for submarine signalling
128,295	21/7/17	10,525	A. E. Ericson	Radio-controlled vessels
128,383	18/6/18	10,007	N. Lea	C.W. syntonisers
128,614	7/8/17	11,360	Soc. Franc. Radio-Elec.	A.C. generators
128,624	14/8/17	11,658	L. Rota and E. Binetti	Wireless apparatus
128,665	29/8/17	12,441	G. Marconi and C. S. Franklin	Reflectors
128,673	1/9/17	12,577	C. S. Franklin	Short-wave receivers
128,682	30/1/18	1,757	B.T.H. Co., Ltd. ..	Wireless signalling
128,983	8/9/17	12,911	C. S. Franklin	Short-wave transmitters
129,051	15/4/18	6,384	C. E. Hiatt and Edison Swan Elec. Co., Ltd.	Valves
129,140	17/7/18	11,750	E. S. Heurtley	Relays
129,238	24/3/19	7,345	A. Taylor	Radio oscillation generators
129,313	10/10/17	14,652	B.T.H. Co., Ltd. ..	Amplifiers
129,336	24/10/17	15,464	R. A. W. Watt	Aerial circuits for W.T.
129,346	26/10/17	15,610	J. H. Rogers and H. H. Lyon	Wireless signalling
129,579	4/2/19	2,751	J. S. E. Townsend ..	Electric wave meters
129,625	28/5/19	13,523	M.W.T. Co. of America, R. A. Weagant, and F. N. Waterman	Apparatus for elimination of strays
129,659	12/9/17	13,094	M. Latour	Relays: amplifying apparatus
129,660	1/10/17	14,165	M. Latour	Relays: amplifying apparatus
129,661	25/10/17	15,543	M. Latour	Relays: amplifying apparatus
129,670	20/11/17	17,116	R. A. Fessenden and F. H. Leslie	Apparatus for eliminating vibrations
129,700	29/11/17	17,674	A. Marino	Spark-gap apparatus for W.T.
129,703	30/11/17	17,722	H. H. MacTaggart and R. G. Scott	Wireless masts, etc.
129,722	8/12/17	18,228	B.T.H. Co., Ltd. ..	Wireless signalling
129,774	13/12/18	11,231	H. H. Ayscough ..	Instrument for teaching Morse alphabet
130,012	14/12/17	18,621	M. Latour	Relays: amplifying apparatus
130,014	17/12/17	18,753	M. Latour	Dynamo-elec. machines
130,022	20/12/17	18,920	M. Latour	Relays: amplifying apparatus
130,039	2/1/18	120	G. A. Beauvais	Vacuum tubes
130,040	2/1/18	121	G. A. Beauvais	Vacuum tubes
130,056	9/1/18	555	M. Latour	Relays: amplifying apparatus
130,064	11/1/18	676	B.T.H. Co., Ltd. ..	Wireless signalling
130,090	19/1/18	1,109	B.T.H. Co., Ltd. ..	Wireless signalling
130,103	16/4/17	3,140	M. Latour	Relays: amplifying apparatus
130,107	25/4/18	6,991	H. Richmond	Elimination of interference in W.T.
130,219	7/10/18	16,297	Western Elec. Co., Ltd.	Apparatus for H. F. signalling
130,368	31/1/18	1,833	J. Hettinger and C. A. Vandervell	Optical indicators
130,369	1/2/18	1,886	B.T.H. Co., Ltd. ..	Wireless signalling
130,400	15/2/18	2,746	B.T.H. Co., Ltd. ..	Electron discharge devices
130,408	16/2/18	2,796	L. B. Turner	Electric relays
130,413	19/2/18	2,880	C. Horsfield	Anti-vibration supports for aircraft wireless
130,429	23/2/18	3,244	J. S. E. Townsend ..	Means for detecting small elec. currents
130,432	30/4/18	7,252	Western Elec. Co., Ltd.	Duplex telegraphy
130,490	20/8/18	13,536	R. E. Ellis	Direction-finding
130,520	4/11/18	18,078	N. Lea	Wireless signalling
130,537	10/12/18	20,546	M. A. Codd	Make and break device for induction coils
130,642	22/6/17	3,406	G. Plaisant	Dynamo-electric machines
130,643	22/6/17	3,407	G. Plaisant	Dynamo electric machines
130,667	8/3/18	4,057	W. H. Edridge and E. E. G. Boite	Variable condensers
130,762	7/8/18	12,828	B.T.H. Co., Ltd. ..	Recording apparatus
130,888	14/1/19	965	W. H. Edridge and E. E. G. Boite	Variable condensers
131,018	20/3/18	4,935	G. A. Beauvais	H. F. Elec. installations
131,054	5/4/18	5,886	L. N. Brillouin	Wireless telegraphy
131,055	5/4/18	5,887	L. N. Brillouin	Wireless telegraphy
131,056	16/4/17	5,927	M. Latour	Relays: amplifying apparatus
131,092	26/4/18	7,083	M. Latour	Relays: amplifying apparatus

BRITISH PATENT SPECIFICATIONS PUBLISHED DURING 1919 (*continued*).

Specification No.	Date of Application.	No. of Application.	Name of Inventor.	Subject.
131,166	21/8/18	13,614	L. M. Ericsson & Co.	Apparatus for operating distant devices
131,361	17/5/18	8,287	L. de Forest	Radio signalling system
131,362	25/10/17	8,318	M. Latour	Relays: amplifying apparatus
131,392	18/6/18	10,025	E. Binetti and L. Rota	Concentration of elec. waves in a single direction
131,426	15/8/18	13,321	Western Elec. Co.	H.F. signalling: multiplex telegraphy
131,491	24/9/18	15,500	B.T.H. Co.	X-ray apparatus
131,499	10/10/18	16,491	B.T.H. Co.	Means for controlling A.C.
131,553	6/3/19	5,574	B.T.H. Co.	Wireless signalling
131,561	8/4/19	8,909	A. Taylor	Radio transmission system
131,639	2/7/18	10,816	M. Latour	Relays: amplifying apparatus
131,668	24/7/18	12,078	C. E. Hiatt and Edison Swan Elec. Co., Ltd.	Valves
131,670	24/7/18	12,089	L. Rabinovitch	Valves
131,680	31/7/18	12,510	L. M. Ericsson & Co.	Valves: generating, amplifying and rectifying
131,697	14/8/18	13,203	M. Latour	Valves for rectifying A.C.
131,704	17/8/18	13,417	M. Latour	Telephone relays
131,963	28/6/18	10,714	R. E. Vaughan	Direction-finder
132,022	2/9/18	14,228	N. P. Hinton	Measuring instrument
132,058	14/9/18	14,987	Western Elec. Co.	Power modulators for radio transmission
132,101	18/10/18	17,054	M. Latour	Radio telegraphy and telephony
132,118	14/12/17	18,259	M. Latour	Radio telephonic apparatus
132,131	4/12/19	20,109	G. McAlpine	Relays
132,341	10/9/18	14,703	T. W. Case	Radiant energy signalling system
132,391	4/11/18	18,077	J. Robinson	Electromagnetic wave reception
132,434	11/2/19	3,355	H. J. de Bellescize	Receiving circuits for W.T.
132,435	12/2/19	3,462	H. J. de Bellescize	Receiving circuits for W.T.
132,548	9/1/18	523	R. A. Weagant and Marconi W.T. Co.	Apparatus for eliminating strays
132,562	24/6/18	10,382	Western Elec. Co., Ltd.	H.F. signalling
132,567	19/7/18	11,856	H. A. Ewen	Means for measuring elec. currents
132,668	16/11/18	18,836	M. Latour	Relays: amplifying apparatus
133,083	26/10/17	15,611	J. H. Rogers and H. H. Lyon	Wireless signalling system
133,181	14/10/18	16,735	C. E. Hiatt and Edison Swan Elec. Co., Ltd.	Valves
133,366	28/6/18	10,702	Western Elec. Co., Ltd.	Modulating means for H.F. oscillations
133,403	10/9/18	14,704	T. W. Case	Resistances
133,404	10/9/18	14,705	T. W. Case	Resistances
133,413	4/10/18	16,136	J. Erskine-Murray	Valves
133,513	13/11/18	18,614	H. A. Ewen	Inductance coils
133,901	4/4/19	8,575	A. Taylor	W.T. transmission system
134,045	29/10/18	17,639	B.T.H. Co., Ltd.	System of frequency transformation
134,246	28/6/18	10,717	C. S. Franklin	Short wave receivers
134,297	29/10/18	17,631	M. Compare	"Make and break" apparatus
134,338	4/11/18	17,995	F. O. Hunt	Detector for varying magnetic field
134,341	4/11/18	18,073	P. P. Eckersley and R. Whiddington	Transmitting and receiving systems
134,342	4/11/18	18,075	J. Robinson	Direction-finding apparatus
134,353	9/11/18	18,395	S. G. Brown	Telephone receivers
134,497	24/5/19	13,122	H. J. de Bellescize	Duplex for W.T.
134,560	27/5/18	8,736	J. Robinson	Direction finding
134,585	4/10/18	16,138	B.T.H. Co., Ltd.	Wireless signalling systems
134,590	26/10/18	17,504	M. D. Scott and P. P. Eckersley	Electric switches for wireless signalling
134,644	22/11/18	19,195	Radio Comm. Co., Ltd., and N. P. Hinton	Direction-finding
134,725	20/2/19	4,286	C. D. Ehret	Controlling energy in signalling systems
135,111	4/4/19	8,581	A. Taylor	W.T. transmission system
135,635	6/12/18	20,279	Western Elec. Co., Ltd.	Elimination of strays
135,792	13/6/19	14,934	W. J. Polybank	Valves

NAME INDEX TO BRITISH PATENTS PUBLISHED DURING 1919

U.S.A. PATENT SPECIFICATIONS PUBLISHED DURING 1919

Specification No.	Date of Application.	Patentee.	Assignee.	Subject.
1,290,382	16/3/17	N. H. Slaughter..	Western Elec. Co.	Condenser
1,290,438	5/4/15	R. A. Weagant ..	Marconi W.T. Co.	Valves
1,290,775	28/2/17	S. S. Jones ..	—	Crystal detector
1,291,121	9/11/17	J. St. V. Pletts ..	Marconi W.T. Co.	Calling device
1,291,379	19/1/16	W. T. Birdsall ..	Westinghouse Lamp Co.	Thermionic converter
1,291,441	/8/18	H. P. Donle ..	Connecticut Telephone and Electric Co.	Valve
1,291,527	10/3/17	A. W. Hull ..	General Electric Co.	Receiving system
1,291,641	23/3/18	H. P. Donle ..	Connecticut Telephone and Electric Co.	Valve
1,294,177	13/3/12	W. Schloemilch ..	—	Wave-detector
1,294,326	28/11/17	J. Bethenod ..	—	Oscillation generator
1,294,694	7/8/18	H. J. Nolte ..	General Electric Co.	Vacuum discharge device
1,294,983	27/12/12	G. von Arco and A. Meissner	Gesell. für draht. Telegraphie, m,b.H.	H.F. generators: frequency changers
1,295,245	6/1/16	R. A. Weagant and H. Shoemaker	Marconi W.T. Co.	Method of and apparatus for radio-signalling
1,295,481	28/11/14	A. Greiner and F. J. Farelly	—	Vacuum tube
1,295,499	13/12/13	P. C. Hewitt ..	—	System of electrical distribution
1,296,177	27/11/15	C. S. Franklin ..	Marconi W.T. Co.	Aerials
1,296,504	24/8/12	J. H. Hammond, jun.	—	Wireless telegraphy and telephony
1,297,309	18/11/15	H. D. Arnold ..	Western Elec. Co.	Vacuum tube devices
1,297,313	19/10/16	E. Bellini ..	—	Direction-finder
1,298,396	18/12/16	A. Pruessman ..	Western Elec. Co.	Condenser
1,298,490	12/7/16	L. F. Fuller ..	Federal Telegraph Co.	Oscillation generator
1,298,613	23/4/15	W. C. White ..	General Electric Co.	Wireless signalling system
1,299,356	11/12/16	L. de Forest ..	De Forest Radio Telephone and Telegraph Co.	Wireless signalling system
1,299,823	27/10/17	L. M. Cockaday..	—	Wireless signalling system
1,300,156	27/3/16	L. F. Fuller ..	Federal Telegraph Co.	Wireless signalling system
1,300,157	27/3/16	L. F. Fuller ..	Federal Telegraph Co.	Wireless signalling system
1,301,246	26/2/19	C. S. Franklin ..	Marconi W.T. Co.	Receiver for short waves
1,301,279	20/11/14	I. Langmuir ..	General Electric Co.	Means for controlling electrical energy
1,301,473	26/2/19	G. Marconi and C. S. Franklin	Marconi W.T. Co.	Reflectors
1,301,525	20/8/15	H. J. van der Bijl	Western Elec. Co.	Modulators
1,301,644	13/9/15	O. E. Buckley ..	Western Elec. Co.	Directive transmitting system
1,302,129	27/7/14	V. Bouchardon ..	—	Generators for W.T.
1,302,391	2/6/16	A. Longoria ..	Sterling Electrical Co.	H.F. apparatus
1,303,184	29/12/17	C. D. Ehret ..	—	Apparatus for controlling elec. energy
1,303,325	18/7/17	H. James ..	—	Spark-intensifier
1,303,579	16/4/15	A. McL. Nicolson	Western Elec. Co.	System for successive amplification of energy
1,303,625	2/11/17	A. Artom ..	—	Receiver for W.T.
1,303,729	10/1/19	J. H. Rogers ..	—	Wireless signalling system
1,303,730	11/1/19	J. H. Rogers ..	—	Wireless signalling system
1,304,188	4/6/18	D. G. McCaa ..	—	Controlling apparatus for wireless telephone systems

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Specification No.	Date of Application.	Patentee.	Assignee.	Subject.
1,304,282	9/8/18	O. Durdle ..	Osram-Robertson Lamp Works, Ltd.	Means for supporting electrodes in valves
1,304,296	2/12/16	C. Le G. Fortescue	Westinghouse Elec. & Mfg. Co.	Wireless signalling system
1,304,868	26/2/19	C. S. Franklin ..	Marconi W.T. Co.	Short-wave transmitter
1,305,104	12/8/16	P. C. Hewitt ..	—	Aerials
1,305,202	15/12/17	H. P. Donle ...	Connecticut Telephone and Electric Co.	Wave-meter
1,305,816	25/8/14	F. Lowenstein ..	—	Spark-gap device
1,306,145	15/3/12	J. H. Hammond, jun.	—	Aerial for torpedoes
1,306,170	20/7/15	E. E. Butcher ..	Marconi W.T. Co.	Method of and apparatus for eliminating statics
1,306,208	24/2/15	R. A. Weagant ..	Marconi W.T. Co.	Wireless telegraphy
1,306,223	15/5/16	L. F. Fuller ..	Federal Telegraph Co.	Wireless telegraphy
1,306,474	2/10/15	A. N. Edmonds ..	—	Wireless telegraphy
1,307,155	9/4/18	A. W. Schramm..	—	Aerials for aeroplanes and the like
1,307,341	20/7/17	W.C. Brinton, jun.	Philips-Brinton Co.	Condensers
1,307,385	20/9/17	H. F. Waite ..	—	X-ray tube holder and shield
1,307,507	3/11/17	D. T. May ..	Western Elec. Co.	Condenser
1,307,510	16/4/15	A. McL. Nicolson	Western Elec. Co.	Valves
1,307,511	26/10/16	A. McL. Nicolson	Western Elec. Co.	Valves
1,307,645	11/7/16	H. F. Waite ..	—	X-ray tube current-measuring system
1,307,716	5/6/18	E. A. Watson ..	M.L. Magneto Syndicate, Ltd.	Condenser
1,308,514	23/3/17	G. von. Arco and A. Meissner	—	Frequency changers
1,308,530	25/5/16	G. Reuthe ..	—	Controlling W.T. transmitters
1,308,925	1/3/15	H. D. Betz ..	—	Wireless system
1,309,031	4/6/17	J. Hettinger ..	—	Aerial conductor for wireless signalling
1,309,283	4/9/17	L. F. Fuller ..	Federal Telegraph Co.	Arc transmitter
1,309,400	23/10/16	L. Espenchied ..	American Telephone and Telegraph Co.	Radio frequency interference-balance
1,309,459	10/11/15	J. R. Carson ..	American Telephone and Telegraph Co.	Wireless signalling system
1,309,704	13/6/17	E. R. Stoekle ..	Cutler-Hammer Mnfg. Co.	Valve-amplifier
1,309,778	14/7/17	O. C. Roos ..	—	Arc transmitting system
1,310,041	18/1/17	W. C. White ..	General Elec. Co.	Wireless signalling system
1,310,061	13/4/17	W. D. Coolidge ..	General Elec. Co.	X-ray apparatus
1,310,714	18/1/18	T. B. Rider ..	A. Danziger ..	X-ray tube
1,311,264	4/9/15	L. de Forest ..	De Forest Radio Telephone and Telegraph Co.	Oscillation-generator
1,311,654	31/3/16	F. A. Kolster ..	—	Radio method and apparatus
1,312,972	16/3/16	E. Girardeau and J. Berthenod	—	Apparatus for high-power W.T. stations
1,312,983	11/2/18	O. Heins and C. M. Wild	American Bosch Magneto Corp.	Condensers
1,313,041	24/8/16	E. F. W. Alexanderson	General Elec. Co.	Wireless telephone system
1,313,042	26/11/17	E. F. W. Alexanderson	General Elec. Co.	Duplex system
1,313,070	7/9/16	L. Cohen.. ..	—	Apparatus for eliminating statics
1,313,093	11/3/16	I. Langmuir ..	General Elec. Co.	Wireless signalling system
1,313,112	28/8/16	J. H. Payne, jun.	General Elec. Co.	Valves
1,313,187	8/11/15	A. W. Hull ..	General Elec. Co.	Method and means for amplifying elec. variations
1,313,188	8/11/15	A. W. Hull ..	General Elec. Co.	Means for producing A.C.
1,313,654	25/4/14	R. A. Weagant ..	Marconi W.T. Co.	Receiver of electrical oscillations
1,313,860	12/6/12	J. H. Hammond, jun.	—	Electric-wave relaying system

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Specification No.	Date of Application.	Patentee.	Assignee.	Subject.
1,314,095	25/5/16	G. Reuthe ..	—	Aerials
1,314,102	10/1/14	G. von Arco and A. Meissner	—	Connection for elec. relays working with ionised gas-gap
1,314,152	25/4/18	K. Schmidt ..	American Bosch-Magneto Corp.	Spark-gap apparatus
1,314,251	11/3/15	L. de Forest ..	De Forest Radio Telephone and Telegraph Co.	Radiotelephony
1,314,252	13/5/15	L. de Forest ..	De Forest Radio Telephone and Telegraph Co.	Oscillation-generator
1,314,253	12/10/16	L. de Forest ..	De Forest Radio Telephone and Telegraph Co.	Apparatus for W.T.
1,314,593	2/12/15	P. C. Hewitt ..	—	Directive wireless transmission
1,314,789	5/6/16	F. Conrad ..	Westinghouse Elec. and Mfg. Co.	Wireless signalling system
1,315,197	25/5/18	E. C. Hanson ..	Title Insurance and Trust Co.	Wireless signalling system
1,315,584	22/3/16	F. K. Vreeland ..	Vreeland Apparatus Co.	Selective receiving system
1,315,862	17/1/18	J. H. Rogers ..	—	Aerials
1,317,400	21/12/16	H. M. Stoller ..	Western Electric Co.	Modulating system
1,317,435	23/3/15	P. de Lange ..	Amer. Thermophone Co.	Detector
1,318,277	14/12/17	F. S. Hoover ..	—	Detector
1,318,342	5/2/13	J. H. Hammond, jun.	—	Selective receiving system
1,318,855	15/11/18	C. D. Ehret ..	—	Method and apparatus for controlling elec. energy
1,319,068	15/6/12	J.H.Hammond,jun.	—	System of radio-directive control
1,319,804	17/8/16	M. G. Sjöström ..	Svenska Co.	Crystal detector
1,319,989	26/5/17	D. W. Brown ..	—	Receiving system
1,319,990	27/8/17	D. W. Brown ..	—	Receiving system
1,320,140	27/8/17	E. C. Hanson ..	—	Wireless transmitting system
1,320,141	4/6/18	E. C. Hanson ..	Title Insurance and Trust Co.	Wireless phonograph
1,320,142	4/6/18	E. C. Hanson ..	Title Insurance and Trust Co.	Audio-frequency controlled torpedo
1,320,300	1/6/18	W. H. Wilson ..	—	Production of high-tension discharges
1,320,390	20/2/19	E. C. Hanson ..	—	Lifeboat radio-signalling system
1,320,525	28/7/15	R. R. Beal ..	Federal Telegraph Co.	Wireless telegraphy
1,320,610	3/2/17	G. E. Elia ..	—	Detecting presence of sub marine boats
1,320,685	29/5/12	J. H. Hammond, jun.	—	Wireless telegraphy and telephony
1,320,959	16/10/17	E. F. W. Alexanderson	General Electric Co.	Radio-signalling system
1,321,432	12/5/14	P. C. Hewitt ..	—	Method and apparatus for transforming elec. energy
1,321,436	12/5/14	P. C. Hewitt ..	—	Varying frequency of A.C.
1,321,437	12/5/14	P. C. Hewitt ..	—	Producing and controlling A.C.
1,321,438	16/4/15	P. C. Hewitt ..	Cooper Hewit Elec. Co.	Method and apparatus for transforming elec. energy
1,322,101	4/3/16	C. S. Franklin ..	Marconi W.T. Co.	Aerial
1,322,315	29/11/18	F. Lowenstein ..	—	Generator
1,322,566	18/9/18	J. Hettinger ..	—	Detector
1,322,610	14/6/17	C. Pfanstiehl ..	Pfanstiehl Co. ..	Tungsten electrode
1,322,622	10/11/16	J. H. Rogers and H. H. Lyon ..	—	Aerials
1,323,155	18/1/15	G. H. Clark ..	Marconi W.T. Co.	Adjustment of wave-lengths
1,323,354	12/5/16	C. W. de Mooy ..	De Mooy Electric Co.	H.F. machine
1,323,472	26/1/18	W. J. Headman..	—	H.F. discharge apparatus
1,323,759	18/1/17	A. N. Goldsmith	General Electric Co.	Wireless signalling system
1,323,836	6/10/16	W. D. Coolidge ..	General Electric Co.	Valves
1,324,022	8/2/18	W. C. Ballard ..	International Signal Co.	Quenched spark-gap
1,324,792	17/4/18	W. E. Booth ..	Western Elec. Co.	Apparatus unit
1,325,250	12/10/16	O. G. H. Kehrhahn	—	H.F. generator

NOTE.—The above list of U.S.A. Patents includes those published between January 7th and December 16th, 1919.

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AVIATION SECTION

(A) Relation of Wireless to Flying.

(B) Tabular List of Aviation Stations.

(C) Miscellaneous Items of Interest.

RADIOTELEGRAPHY AND AVIATION

By Major Robert Orme, B.A.

THE Editor has asked me to contribute a few notes, dealing with the general application of wireless to aircraft, although my personal experience of the subject has only been in connection with this application to machines used for Service purposes. There is a far larger field for the use of wireless in civilian aviation in the future, and he would be a daring man who would attempt to dogmatise on the extended powers which it will put in the hands of the aviator, both in maintaining communication with the earth and his fellows, and in safely navigating his craft; I shall, however, restrict myself to a short and, I fear, very incomplete sketch of what has already been accomplished, chiefly under war conditions, during the past five years.

In the summer of 1914 only the most elementary steps had been taken by a few enthusiastic pioneers to make use of wireless for the purpose of communicating from aircraft to the ground. On the civilian side I cannot trace any records of the amount of work done, but from all I have heard I should judge that, practically speaking, no successful results were achieved; this should be taken as applying only to England, but I have not heard that much greater success was attained abroad.

In the Royal Flying Corps a few enthusiasts, of whom Captain James and Captain D. Lewis were the leaders, had been carrying on similar work for some little time. In their experiments they used both accumulator driven coil sets and also power sets driven from the engine. The result of the work done by these enthusiasts was that, at the beginning of the war, the Flying Corps was equipped with a few machines fitted with low-power wireless transmitters, and flown by officers capable of using them; and in addition, for reception on the ground, there existed the rudiments of a technical staff capable of setting up and working small receiving stations.

Practically speaking, crystal detectors alone were available for reception, and I can trace no record of successful intercommunication between machines having been attained; the range in communication from aeroplane to earth, under the conditions existing, was also very short.

On the outbreak of war all civilian experimental work with wireless on aircraft, with the exception of work under direct Government control, had to cease, and all further advance in this country became dependent on the work done by the technical staffs of the Royal Naval Air Service and Royal Flying Corps; in the case of the latter the experimental, as opposed to the testing, staff were, for reasons of policy, attached to the Signals Department of the Royal Engineers, and a certain amount of the early designing was provided by officers of this section. It should be here recorded that civilian wireless engineers were always ready to give a helping hand when difficulties had to be surmounted.

Generally speaking, what has been said with regard to the backward conditions of aircraft wireless when war broke out would apply equally to the rest of the Allies, and probably to Germany as well.

From this it will be seen that practically the entire development of the use of wireless for aircraft has been accomplished since August, 1914, and as all through the war there was a more or less free interchange of technical ideas between the Flying Services of the Allies, it may be claimed with some justification that, in a sketch of what has been achieved in this country, no important development will be overlooked; as regards work done by the Central Powers, it is generally conceded that their rate of advance was not so rapid as that of the Allies.

For the benefit of those who have had no experience of the subject, it would be well, at this point, to deal with the conditions which are encountered in the application of wireless to aircraft. The form of aerial which is almost invariably used, except for directional work, consists of a trailing wire with a light weight attached to its outer end. This weight is very necessary, as without it the wire would trail out behind the machine almost horizontally, and, apart from various mechanical drawbacks which this condition would introduce, there would be no vertical component in the aerial, and radiation woul dbe in the wrong plane, namely, a vertical one. In place of the usual earth, the metal portions of the machine itself—engine, straining wires, etc.—are used, and it is important that these should be connected together electrically. Practically the whole system of aerial and machine forms a complete oscillator. For aerials of a reasonable length the mutual capacity to the counterpoise is considerably lower than the capacity of a similar aerial to earth, the practical result of this being that, in an aerial of, say, 200 feet length, fitted on an ordinary two-seater aeroplane, the fundamental wave-length is found to be only 0·75 of that which would be obtained with the same aerial to earth. This discrepancy is, of course, slightly reduced in the case of large aeroplanes, and could be still further reduced in the case of airships by wiring the whole of the envelope so as to increase the counterpoise; in rigid airships this, of course, would not be necessary.

For practical purposes, in aeroplane work, aerial lengths of from 80 to 300 feet have been used, and the latter may be regarded as a convenient maximum length, in fact, considering the small size of the counterpoise, there would in all probability be little to gain in further increasing the length, and the mechanical difficulty of winding in long aerials must be considered.

With the object of avoiding the risk of damage from trailing aerials, in the case of aeroplanes manœuvring in close formation, aerials consisting of wires strained between different points of the machine have been tried, the counterpoise being provided either by the frame of the machine or other strained wires. For short distances fair results have been obtained, the chief drawback being a very uneven zone of radiation. This directional effect is probably due to the radiation from the counterpoise in many cases tending to neutralise the aerial radiation. In airships, or even in the larger aeroplanes, the problem of the fixed aerial for short range will probably be solved on the lines of an aerial with a fair amount of vertical component and a horizontal counterpoise, the whole system being insulated from the aircraft. In the case of coils used for D.F. work, the conditions are practically the same in the air as those encountered on the ground. There is, however, one disturbing element in all reception work in the air, especially where high amplification is being used: the trouble is

caused by disturbance from the magneto or other electric ignition of the engine. No universal method has been found so far for eliminating this magneto noise, but it has generally yielded to special treatment, such as screening, etc.

There is one important point that must be borne in mind by all designers of wireless apparatus for aircraft, namely, that while on the one hand the bulk and weight of the apparatus used in land, and even in ship, stations are matters of relatively very small importance, on the other hand, in the case of aircraft, these two factors, and especially the latter one, are vital. Another point that must be remembered is that any exposed spark may result in a disastrous fire, owing to the fact that a faulty petrol joint, or similar cause, may mean petrol leaking on to the wireless apparatus. More than one fatal accident was attributed to this cause in the early days of the war, when exposed spark gaps were common, and keys were more or less unprotected. I had the good fortune never to experience a bad accident from this cause in any of the machines with which I had to deal, but one of my earliest recollections in the R.F.C. was seeing the centre section burnt out of my only experimental machine, owing to the mechanic accidentally pressing the key of the transmitter when filling the petrol tanks; the overflow was fitted directly over the transmitter, and the fire was started by petrol splashing directly on to the key.

At the outbreak of war the value of aircraft for artillery spotting quickly became manifest, and the substitution of wireless communication for the visual signals, used at first for this work, was very rapid. In the very early days two or three transmitters were tried, and a small auto-jigger coil set, which was introduced in the late autumn of 1914, was quickly adopted as standard; this set has survived, with slight modifications, as the chief short range spark set in the Service up to the present day. The original set was accumulator driven, but one modification, which gave very good results, consisted in adapting it to work with a wind-driven A.C. generator which supplied the same amount of energy as the accumulators, namely, about 40 watts. This modified set naturally gave a note which varied with the air speed of the machine, and, for this reason, the accumulator set proved the more valuable in all cases where there was much liability to jamming from other machines fitted with similar sets, as, in addition to the use of various wave-lengths as a protection against this, a further protection was obtained by means of a very ingenious break on the coil, which by a simple adjustment could be tuned to produce and maintain any desired note over a considerable range. The ground receiving station for this work was equipped with a coupled circuit tuner, with crystal detector, and a stand-by switch to direct aerial for picking up signals. Only a small range of tuning was required in this set, as the transmitters were all of one fixed wave-length, and the range was limited to variations in length of the transmitting aerial. The original tuner designed for this work has been very largely modified, the modifications being in the direction of greater selectivity and sensitivity, and lesser bulk and weight; with a single aerial of 50 or 60 yards on a 30-foot mast the average range of reception was about 10 or 12 miles. As may be imagined, there were at any time a large number of these ground stations in operation along the front, and a large number of machines, some of them at times working very close together, pumping

down messages, the accurate reception of which was of the utmost importance; and it reflects great credit on both the observers in the machines and the operators at the ground stations that the percentage of successful observations was always very high.

During the first year of the war there was not much demand, in the R.F.C. at any rate, for a transmitter to give greater range than was obtained with the last-mentioned set. A power-driven French set, known as the "Rouzet," was, however, available; and working under similar conditions a range two to three times greater could be obtained. The generator was practically always driven off the engine, and for rotary engines a flexible drive was designed which gave satisfactory results. Bearing in mind what has been said about risk of fire, this set was a most undesirable one for use in aircraft, as it possesses an exposed synchronous spark gap, with several gaps in series, and short of boxing in the entire generator no adequate precaution could be taken. The longest range spark set which was used in practical work was produced in 1915, it was a very neat and ingenious piece of work, and, although its weight and bulk were within limits which allowed of its use in an aeroplane, this set, which was generator driven, was capable of an output of 2·5 kw.; power was provided by a windmill or propeller of suitable pitch mounted on the generator.

Other spark sets were produced of medium power, obtaining their energy from either wind-driven generators or accumulators, and two or three of these were used to a considerable extent, but experience showed the virtual impossibility of getting good results out of any accumulator driven set using a trembler break, if an input of much over 40 watts was required; this difficulty is very successfully solved in the Wilson set, but it is necessarily at the cost of increased bulk and weight.

It was early realised that to obtain increased range the most promising road to success lay in the direction of improvements at the receiving end, and in the spring of 1915 a series of tests were carried out at Brooklands, in order to decide on the comparative merits of the two chief types of valve then available: an English-made valve with suitable circuits gave the most promising results, and although no practical development of these results was asked for by the R.F.C. authorities at the time, a considerable amount of experimental work was carried out, and useful data were recorded which proved very valuable at a later date. In the Royal Naval Air Service, on the other hand, the ability to maintain long range communication was always a matter of great importance, owing to the nature of the work in which their machines were chiefly engaged; in consequence of this, early use was made by them of the opportunities afforded by the valve, and on the introduction of the French type rapid progress was made in the design of sets, both for reception and for C.W. transmission.

The Brooklands experiments mentioned above were continued with the English valve—the French type not yet being available—and in the autumn of 1915 a valve transmitting set was designed for use in aircraft, the primary object of which was the transmission of speech, a microphone being inserted in the aerial circuit. As very good results were obtained with this instrument, it was sent out to France and tested by the authorities there, and, although it was not considered at the time that wireless telephony could be made use of in service work, the knowledge of its possibilities, gained by those taking part in the

test, probably led to the demand for wireless telephony between machines, which was brought forward nearly a year later. This set is especially interesting owing to the fact that it was probably the first valve transmitting set, and certainly the first wireless telephone set, to be used in an aeroplane. By means of a single plug and three sockets it could be used to transmit either :—

(1) Pure C.W.,
(2) Interrupted C.W. (Tonic Train),
(3) Telephony.

The Tonic Train was produced by a buzzer in the aerial circuit, and gave a range considerably greater than that obtained when using the telephone. Using a crystal receiver combined with a single valve, fair speech was received from machine to ground over a range of 20 miles, 600 volts H.T. was employed, and to provide this, dry cells were used at first, but later on a wind-driven generator was designed to take their place.

As will be gathered from what has already been said, the application of the valve has opened up a high road to success in dealing with the difficulties inherent to the general use of wireless in connection with aircraft. Until the valve was available, or, rather, until its possibilities began to be realised, transmission from aircraft could, in the nature of things, only be received over a very limited range, while, at the same time, reception in the machine, of even the strongest signals, was almost impossible, owing to the noise caused by the engine and the wind entirely drowning any faint sound. Efforts were made to increase the strength of the signals by using a mechanical low-frequency amplifier, such as the Brown Relay, and success was obtained in the R.N.A.S., but experiments at Brooklands with tuners so fitted suggested that, at best, very fragmentary reception might be expected under the most favourable conditions.

It must not be forgotten that the general use of wireless in aircraft involved one very important change of method. The manipulation of the transmitting and receiving instruments in ship and land stations is always in the hands of experts, or, at any rate, of men trained to handle and adjust the instruments with which they have to deal ; in the air, on the other hand, this condition can only be very rarely fulfilled. In war conditions the operator will be an officer or airman who should not be expected to do more to his set than to turn a switch or press a key. Of course, in the larger machines and airships a trained operator might be provided. In what is called commercial aviation the same conditions will exist, certainly in the case of small machines. The moral of this is that, in designing sets or selecting systems for wireless in aircraft, the watchword should be " Foolproof," have as few and as simple adjustments as possible, and make these few obvious and easy to handle with cold fingers under extreme vibration. The use of a mechanical relay is an extreme example of the opposite practice, but it must be remembered that it was tried when results were urgently needed.

Before the amalgamation of the two branches of the flying service, the chief problem put forward for solution by the authorities of the Royal Flying Corps was, undoubtedly, inter-machine telephony, with the numerous side issues involved in it. The original range asked for between the machines was two miles, but a large margin of safety had to be allowed in designing the system, and no sets were passed for

service which would not give or receive six to eight miles. During the air tests, ranges of sixteen, and even eighteen, miles have been obtained. Short trailing aerials were used, but in course of time a difficult problem was introduced, as an aerial was asked for which should not extend beyond the limits of the machine. As has been before mentioned, a partial solution only has been found so far, as it has not been found possible to design a fixed aerial capable of giving a reasonable range and at the same time free from directional faults. By introducing a more sensitive tuner, however, the necessary range has been obtained with a fixed aerial in the line of minimum horizontal radiation. In addition to inter-machine telephony a more powerful telephone transmitter is used for transmission from the ground to the machine; with the aid of these, and employing suitable reception at the ground station, telephonic conversation can be maintained with aircraft over very considerable ranges.

Meanwhile the Royal Naval Air Service were engaged in working out the best methods of dealing with the special requirements arising from the class of work in which their machines were chiefly occupied. These requirements came under two main heads—the maintenance of inter-communication between aircraft and ground or ship stations over long distances by telegraphy, involving incidentally inter-communication between machines, and the development of directional reception, and methods of utilising it, for navigation and similar purposes. A large amount of valuable work has been carried out in both these fields, and the instruments provided for inter-communication have successfully accomplished all that was required of them. The results have been obtained, except in the case of very short ranges, chiefly by means of either Tonic Train or Heterodyne; the former is perhaps more suitable where the distance is not too great, but for extreme distances the latter is necessary, and it must be remembered that, except in the case of very large aircraft, the extra bulk and weight of a Tonic Train transmitter render it unsuitable. Directional reception, including its natural corollary, navigation by means of wireless guidance, may be considered the most valuable benefit conferred by radiotelegraphy on the future of aeronautics. In the case of any aircraft flying at night, or over the sea, or in or above a layer of fog or clouds, in fact, in any case where the machine is unable to take observations on fixed objects on the earth, and to a lesser extent when flying over unknown country, it would be no exaggeration to say that, in the majority of cases, the pilot can have no idea of the actual direction in which he is travelling, or of his actual speed over the earth in that direction; his compass tells him in what magnetic direction he is flying through the air, and his speed indicator shows him at what rate he is travelling through it, but there is nothing to show him in what direction or at what speed the air itself is moving with relation to the surface of the earth; and although the pilot may have known the exact conditions of the wind when he started his flight, these conditions vary at different altitudes, and are also liable to rapid change. The effect of this movement of the air is that, except in the very calmest weather, a machine never travels over the earth in the direction towards which it is pointing, unless in the very rare cases when that direction is exactly up or down wind, and even then a calculation of the ground distance travelled, based on the only data available—namely, speed

indicator readings and the time elapsed, is bound to be far from correct. From the above it will be seen that the difficulties met with by the navigator in the air are far greater than those encountered at sea, for, although the latter medium has its currents and streams, their speeds and directions are known and charted. Some wonderful performances have been accomplished by pilots in long-distance flights without the aid of wireless, even in cases where opportunities of earth observation were very limited; but, on the other hand, many machines have been lost, or have landed far from their intended goal, under similar conditions. The fate encountered by the Zeppelins which took part in the last raid over England is a good example of what may happen to aircraft when earth observation is not possible and wireless guidance not available.

The machines engaged in these raids were always navigated by a method of wireless guidance, in which signals sent out at stated intervals from the airship were picked up by two separate directional air stations at opposite ends of a long base; the position of the airship was immediately plotted from these two observations, and communicated to her by wireless. The transmitting station usually employed for this work had been bombed just before the raid in question, and it was noticed that the guiding signals sent out from the base were weak and faulty. As a result of this the Zeppelins, which had come across to the Yorkshire coast, apparently got out of range with the transmitting station. (This conclusion is based on observations at a receiving station in England.) The night was dark and overcast, with a strong north wind blowing, and it is highly probable that not one of the pilots had the faintest idea of the true direction in which he was travelling; the result of this was apparent the next morning, the whole fleet being scattered over Southern France, one or more airships being lost in the Mediterranean. Up to the present no alternative method of navigating aircraft when out of sight of the ground for any considerable period has been suggested, if we except methods based on celestial observations. These are bound to be unsatisfactory, as, putting other difficulties out of the question, in the case of high cloud the opportunities of taking them might be rare, or entirely lacking. Bearing on this, it must be remembered that aircraft travel very rapidly, and that the vast majority of them cannot "heave to" when in doubt.

A large amount of work has already been done, under service conditions, in the development of directional wireless, and excellent results have been obtained; the methods chiefly employed have made use of directional aerials, or rather coils, in the aircraft, thus enabling the actual position of the machine to be plotted at any moment by observations on two known ground transmitting stations, and, incidentally, enabling the correct bearing of any transmitting station to be ascertained.

Perhaps it may appear that undue emphasis has been laid on directional work, but it is probable that aviation will be largely influenced by its successful use. There seems to be no question that the simplification and improvement of the methods and instruments designed to enable the aerial navigator to carry out his work, regardless of visual observation, will provide the most valuable contribution that the wireless engineer can offer to the science of aeronautics.

AVIATION STATIONS

Name.	Geographical Position.	Call Signal.	Normal Range.	Controlled by	Wave-lengths in Metres (the Normal Wave-length in Heavy Type).	Nature of Service.	Hours of Service.	Coast Charge. Per Word.	Coast Charge. Minimum Charge.	Remarks.
								Francs.	Francs.	
HOLLAND										
Aerodromes ..	—	PCF[1]	—	—	—	—	—	—	—	[1] This call sign is allotted to all the Royal Naval Aviation Fields; when necessary it is followed by the name or number of the aviation field
PANAMA (CANAL ZONE)										
Coco Solo*	—	NNL	—	U.S. Navy ..	300, **600**	—	—	—	—	
UNITED KINGDOM										
Castle Bromwich[2] ..	—	GEC	—	—	900 C.W. or R.T.	—	—	—	—	[1] This station will shortly be moved to Croydon [2] In course of erection
Didsbury[2]	—	GEM	—	—	900 C.W. or R.T.	—	—	—	—	
Hounslow[1]	—	GED	—	—	900 C.W. or R.T.	—	—	—	—	
India House ..	—	GFA	—	Air Ministry ..	1,400 (C.W.)	O ..	—	—	—	
Lympne[2]	—	GEG	—	—	900 C.W. or R.T.	—	—	—	—	
Renfrew[2]	—	GER	—	—	900 C.W. or R.T.	—	—	—	—	
UNITED STATES OF AMERICA										
Anacosta NSF* ..	District of Columbia	NSF	—	U.S. Navy ..	300, **600**	—	—	—	—	
Bellefonte	Pennsylvania	WWQ	—	Post Office Dept.	—	—	—	—	—	
Chatham NXA* ..	Massachusetts	NXA	—	U.S. Navy ..	300, **600**	—	—	—	—	
Chicago WWG ..	—	WWG	—	Post Office Dept.	—	—	—	—	—	
Cleveland WWO ..	Ohio	WWO	—	Post Office Dept.	—	—	—	—	—	
College Park.. ..	Maryland	WWX	—	Post Office Dept.	—	—	—	—	—	
Fire Island NAG* ..	New York	NAG	—	U.S. Navy ..	300, **600**	—	—	—	—	
Fisherman's Island*	Virginia	NBF	—	U.S. Navy ..	300, **600**	—	—	—	—	
Hampton Roads* ..	Virginia	NAM	—	U.S. Navy ..	300, **600**	—	—	—	—	
Newark	New Jersey	WWU	—	Post Office Dept.	—	—	—	—	—	

Stations marked thus (*) are also open to General Public Service.

THE MARKING OF AIRCRAFT

(*A*) The nationality mark shall be represented by capital letters in Roman characters—*e.g.*, France, F.

The registration mark shall be represented by a group of four capital letters; each group shall contain at least one vowel, and for this purpose the letter Y shall be considered as a vowel. The complete group of five letters shall be used as a call sign of the particular aircraft in making or receiving signals by wireless telegraphy or other methods of communication, except when opening up communication by means of visual signals, when the usual methods will be employed. The nationality and registration marks are assigned in accordance with the table.

(*B*) On aircraft other than State and commercial, the registration mark shall be underlined with a black line.

TABLE OF MARKS

The nationality mark of the State named below applies to the aircraft of its Dominions, Colonies, Protectorates, Dependencies, or of countries of which it is the Mandatory Power.

Country.	Nationality Mark.	Registration of Marks.
United States of America	N	All communications made in accordance with the provisions of Section 1 (*A*) using a group of four letters out of the 26 of the alphabet, each group containing at least one vowel—*e.g.*, ADCJ, PURN
British Empire	G	
France	F	
Italy	I	
Japan	J	
Bolivia	C	All communications made with B as first letter.
Cuba	C	" " " C "
Portugal	C	" " " P "
Roumania	C	" " " R "
Uruguay	C	" " " U "
Czecho-Slovakia	L	" " " B "
Guatemala	L	" " " G "
Liberia	L	" " " L "
Brazil	P	" " " B "
Poland	P	" " " P "
Belgium	O	" " " B "
Peru	O	" " " P "
China	X	" " " C "
Honduras	X	" " " H "
Serbia-Croatia-Slavonia	X	" " " S "
Haiti	H	" " " H "
Siam	H	" " " S "
Ecuador	E	" " " E "
Greece	S	" " " G "
Panama	S	" " " P "
Hedjaz	A	" " " H "

AIRCRAFT FITTED WITH WIRELESS TELEPHONY

GREAT BRITAIN :—

Airco Machine No. GEALU.

Handley-Page Machine No. GEALX.

USEFUL DATA SECTION

(A) Wireless Terminology :—

(i) Definitions.

(ii) Foreign Equivalents.

(B) General Information and Useful Tables.

USEFUL DATA

Specially Revised for the Year-Book by E. V. Appleton, M.A. (Cantab.), B.Sc. (Lond.).

In view of the increasing amount of space taken up by other sections it proved impossible to continue the development and expansion of this section *within the Year Book* so as to meet all the requirements of the recent phenomenal growth of the radio art. Moreover, such a course would hardly seem desirable, as such information could only be adequately treated in a volume wholly devoted to the subject. We therefore publish a separate volume under the title *Standard Tables and Equations in Radiotelegraphy*, compiled and edited for "The Wireless Press, Ltd.," by Bertram Hoyle, M.Sc. (Tech.), A.M.I.E.E.

The whole of the following section has been revised and brought up to date, and space has also been found for several additional features. It is natural to associate the later development of radiotelegraphy with the evolution of the thermionic valve, and in view of this a table of Atomic and Electronic Data has been added, while the list of definitions has been expanded so as to include all the present valve nomenclature. In spite of the amount of work already done, thermionic valve and allied wireless problems still offer an extensive and profitable field for investigation to both amateur and professional wireless men, and in this connection a convenient and adequate system of recording circuits used is required. We have therefore included a sub-section on the conventional symbols commonly used in wireless diagrams.

WIRELESS TERMINOLOGY

(A) Definitions.

Note.—Terms are generally arranged alphabetically according to the *noun* referred to.

1. Aerial.—The system of conductors designed to radiate, or absorb electro-magnetic waves.

2. Aerial Circuit.—The circuit comprising the aerial conductors, the earth conductors, and all inductances and condensers connected between them. As the aerial wires possess capacity with respect to the earth and the aerial conductors themselves possess inductance the aerial circuit has a natural oscillation frequency.

3. Aerial Resistance.—(See Antenna Resistance).

4. Æther.—See Ether.

5. Alternating Current.—One which reverses its direction periodically with time, the "periodic time" being the interval between two successive maxima of current in the same direction.

6. Alternator.—A rotating machine which transforms mechanical energy into electrical energy, producing at its terminals one or more alternating E.M.F.'s (single phase or polyphase).

7. Ammeter (Hot Band: Hot Wire).—An ammeter dependent for its indications upon the change in dimensions of an element which is heated by a current through it. In most cases the expansion of the wire is measured by the alteration in the amount of sag.

8. Ammeter, Thermo.—An instrument for measuring current, depending for its indications on the voltage generated at the terminals of a thermo junction heated either directly or indirectly by the current to be measured.

9. AMPERE-TURN.—The unit of magneto motive force. In an air case solemoid the magneto motive force is equal to the product of the number of turns of the coil and the ampèrage through the coil.

10. AMPLIFIER OR AMPLIFYING RELAY.—An instrument which modifies the effect of a local source of energy in accordance with the variations of received energy; and in general produces a larger indication than could be had from the incoming energy alone. Most modern amplifiers consist of arrangements of three-electrode valves in cascade, the inter-valve connections being made by transformers, high resistances or condensers or by combinations of these.

11. AMPLIFIER, HIGH FREQUENCY.—An amplifier designed for the amplification of high or radiofrequency oscillations. In a valve amplifier of this type air core transformers are commonly used as the inter-valve connections.

12. AMPLIFIER, LOW FREQUENCY.—An amplifier designed for the amplification of low or audio-frequency signals. In a valve amplifier of this type iron core transformers are commonly used as the intervalve connections.

13. AMPLIFICATION, CO-EFFICIENT OF.—The ratio of the useful effect obtained by the employment of the amplifier to the useful effect obtained without that instrument. In particular the amplification constant of a thermionic valve may be defined as the ratio of the slopes of the grid voltage—anode current and the anode voltage—anode current charasteristics at any operating point.

14. AMPLITUDE.—The maximum value of current or voltage attained during any half period of an alternating current or voltage is called the amplitude during that half period.

15. ANGULAR VELOCITY (or ANGULAR FREQUENCY).—Of a periodic alternating current or voltage is the product of 2π and the frequency in cycles per second.

16. ANODE.—(a) In an electrolytic cell. The conductor through which the current enters the liquid.

(b) In a primary cell. The metal (usually zinc) through which the current enters the electrolyte. It is also termed the negative terminal.

(c) The terminal by which the current enters a cell or other apparatus, such as a vacuum tube, thermionic valve, etc. In a thermionic valve the anode is often termed the " plate " or less commonly the " sheath."

17. ANODE CIRCUIT.—See Plate Circuit.

18. ANTENNA.—See Aerial.

19. ANTENNA, DIRECTIVE.—An antenna having the property of radiating a maximum of energy in one (or more) directions.

20. ANTENNA, FLAT TOP.—An antenna having horizontal wires at the top covering a large area.

21. ANTENNA, HARP.—An antenna having an approximately vertical section of large area and considerable width.

22. ANTENNA, INVERTED L.—A flat top antenna in which the leading down wires are taken down from one end of the long horizontal section.

23. ANTENNA, LOOP.—An antenna in which the wires form a closed circuit part of which may be the ground.

24. ANTENNA, PLAIN.—An approximately vertical single wire.

25. ANTENNA, T.—A flat top antenna in which the horizontal section is long and narrow, the leading down wires being taken from the centre.

26. ANTENNA, UMBRELLA.—An antenna the conductors of which form the elements of a cone from the elevated apex of which the leading down wires are brought.

27. ANTENNA RESISTANCE.— Is that resistance which if inserted at the antinode of current in the antenna would dissipate the same power as that radiated by the antenna.

Antenna resistance includes:

(a) Radiation resistance.
(b) Ground or earth resistance.

(c) Radio frequency ohmic resistance of antenna and loading coil and shortening condensers.
(d) Equivalent resistance due to corona, eddy currents, and insulator leakage.
(e) Absorption in neighbouring imperfect dielectrics.

28. Aperiodic Circuit.—A circuit which has no definite time period, this being due either to its resistance being large enough to prevent natural oscillations occurring or to its having no capacity or no inductance and therefore no oscillatory properties.

29. Arc.—"A luminous discharge of electricity through a gas in which the material of one or both the electrodes is volatilised and takes part in the conduction of the current, whether continuous or alternating" (B.E.C.). Arc.—The passage of an electric current of relatively high density through a gas or vapour the conductivity of which is mainly due to the electron emission from the self heated cathode. Under present practical conditions the phenomena take place near atmospheric pressure (I.R.E.).

30. Arc Oscillator.—An arc used with an oscillating circuit for the conversion of direct to alternating or pulsating current. The oscillations generated are classified as follows:

Class (1).—Those in which the amplitude of the oscillation circuit current produced is less than the direct current through the arc.

Class (2).—Those in which the amplitude of the oscillation circuit current is at least equal to the direct current, but in which the direction of the current through the arc is never reversed.

Class (3).—Those in which the amplitude of the initial portion of the oscillation circuit current is greater than the direct current passing through the arc, and in which the direction of the current through the arc is periodically reversed.

31. Arrester, Earth.—A spark gap with a small gap and large sparking surfaces; used to protect receiving apparatus from powerful discharges.

32. Asynchronous.—"A term applied to an A.C. generator or motor, the speed of which has no fixed relation to the frequency of the current" (I.E.C.).

33. Atmospheric Absorption.—That portion of the total loss of radiated energy due to atmospheric conductivity, reflection, and refraction.

34. Atmospherics.—Disturbances produced in the receiving circuits caused by electrical action in the atmosphere or in the earth's surface. They are also known as "X's," "Strays," or "Parasitic Signals," and in the U.S.A. as "Static."

35. Attenuation (Radio).—This is the decrease, with distance from the radiating source, of the amplitude of the electric and magnetic forces constituting an electro-magnetic wave.

36. Attenuation, Coefficient of (Radio).—The coefficient, which, when multiplied by the distance of transmission through a uniform medium, gives the natural logarithm of the ratio of the amplitude of the electric or magnetic force at that distance to the initial value of the corresponding quantity.

37. Audibility.—The ratio of the telephone current variation producing the received signal to that producing a just audible signal, *i.e.*, one which permits the mere differentiation of dots and dashes.

The measurement of audibility is an arbitrary method for determining the relative loudness of telephone response in radio receivers, in which it is stated that a signal has an audibility of given value. The determination of the above ratio may be made by placing a resistance in parallel with the telephone and reducing its value until the limit of audibility is reached. The audibility of the given signals is then given by $\frac{s+t}{s}$ where s is the impedance of the shunt and t the impedance of the telephone for the frequency and wave-form of the impulses through it.

38. AUTODYNE RECEPTION (also termed ENDODYNE RECEPTION).—A scheme of reception for continuous waves in which the receiver itself generates the local oscillations required for the production of a beat note with the incoming oscillations.

39. AUTO-JIGGER.—See Jigger.

40. AUTOMATIC RECEIVER.—A receiver which records signals so they can be translated at any convenient time after reception.

41. AUTO-TRANSFORMER.—A coil with a core of air or iron in which the primary and secondary windings have a number of turns in common.

42. AUTOMATIC TRANSMITTER.—A transmitter which has the usual operating key replaced by any mechanical telegraph sender such as a Wheatstone transmitter.

43. BALANCING AERIAL.—An aerial used in duplex wireless telegraphy. It fills a purpose similar to that of the artificial line in duplex wire telegraphy.

44. BATTERY.—A primary or secondary cell for producing electric current or a collection of such units. A collection of condenser units.

45. BEAT.—When two oscillations of slightly different frequencies are impressed on an electrical circuit they periodically help and oppose each other. The result is an oscillation the amplitude of which varies in a regular and periodic manner. The time between two successive maxima of amplitude is called the period of the beat. The beat frequency is equal to the difference of the frequencies of the component oscillations.

46. BLUE GLOW.—In a soft thermionic valve is the emission of light which accompanies intense ionisation by collision.

47. BRUSH DISCHARGE.—" A discharge having a feathery form, and consisting of an intermittent partial discharge which takes place from a conductor when the potential difference exceeds a certain limit, but is not high enough to cause the formation of a true spark or arc. It is always accompanied by a hissing or cracking sound " (I.E.C.). When such a discharge is being given off by a conductor the latter is said to be " Brushing."

48. BRUSH OR CORONAL LOSSES.—Those due to leakage convection electric currents through a gaseous medium.

49. BUZZER.—A small mechanism (usually electromagnetic) used for rapidly making and breaking an electric circuit. When connected in series with part of a circuit in which oscillations are possible it continually impulses the circuit, thereby producing oscillations which are convenient for testing purposes.

50. CAGE CONDUCTOR.—A group of parallel wires arranged as the elements of a long cylinder.

NOTE.—Any conducting element of an antenna may be a cage conductor.

51. CAPACITY.—That property of a material system by virtue of which it is capable of storing energy electrostatically. The capacity of a system is dependent on its geometrical dimensions, its position relative to other conductors and the dielectric constants of the surrounding media.

Capacity is measured by the ratio of the quantity of electricity stored to the potential difference at which it is stored.

A distinctive property of a capacity is that it permits the passage of electrical energy through it only in the form of displacement currents. The reactance of a capacity C for such currents is equal to $\frac{1}{Cp}$ where p is the angular frequency of the alternating current.

52. CAPACITY, EFFECTIVE, OF AN ANTENNA.—The effective capacity and effective inductance of an antenna at any oscillation frequency are the equivalent capacity and inductance values determined from the following fundamental equations :

$$\omega = \sqrt{\frac{1}{LC}} \quad . \quad . \quad . \quad . \quad . \quad . \qquad (1)$$

where L = the total antenna inductance,

C = the total antenna capacity,
ω = the angular velocity of the free alternating currents in the antenna.

$$d=\pi R\sqrt{\frac{C}{L}} \quad . \quad . \quad . \quad . \quad . \quad . \qquad (2)$$

or

$$d'=\pi R'\sqrt{\frac{C}{L}} \quad . \quad . \quad . \quad . \quad . \quad . \qquad (2a)$$

where R' = series resistance inserted at the base of the antenna and
d' = increased decrement resulting therefrom.

Solving (1) and (2a) for L and C, we have

$$L=\frac{\pi R'}{\omega d'}=\frac{R'}{6\times 10^8\times d'}\cdot \lambda \qquad (\lambda \text{ in meters})$$

$$C=\frac{d'}{R'}=\frac{d'}{6\pi^2\times 10^8\times R'}\cdot \lambda \qquad (\lambda \text{ in meters}).$$

Having the antenna inductance and capacity, the resistance R of the antenna can be determined from equation (2). This value of R satisfies the fundamental equation:

RI^2 = power absorbed by the antenna,
where I = current measured at the base of the antenna.

NOTE.—The equation

$$I=\omega CE$$

$$\left(\text{and also } E=\frac{\pi R'}{d'}\ .\ I\right)$$

defines an effective voltage E, which is the voltage approximately given by the equation. Energy per spark $=\frac{1}{2}CE^2$.

A useful approximate formula for the fundamental wave-length of an inverted L antenna is the following:

$$\lambda \text{ (metres)} = 1,884 \sqrt{\left(L+\frac{L_0}{3}\right) C_0}$$

where C_0 is calculated static capacity,
L_0 is ordinary calculated inductance in microhenries.
L is inductance of loading coil in microhenries.

53. CATHODE.—See Kathode.

54. CATHODE OF THERMIONIC VALVE.—See Filament.

55. CENTRE OF CAPACITY OF AN ANTENNA.—See Form Factor, Note 2.

56. CHANGER, FREQUENCY.—A device delivering alternating currents at a frequency which is some multiple of frequency of the supply current.

57. CHANGER, WAVE.—A transmitting device for rapidly and positively changing the wave length.

58. CHARACTERISTIC CURVE.—A curve showing the variation of a property of a material or a piece of apparatus when submitted to a changing influence which produces that variation.

The characteristic curves of a thermionic valve or arc or crystal show the relations between the various applied potentials and resulting currents.

59. CHARACTERISTIC, DYNAMIC, OF A CONDUCTOR (for a given frequency and between given extremes of impressed E.M.F. and resultant current through the conductor).—This is the relation given by the curve obtained when the impressed E.M.F.'s are plotted as ordinates against the resultant currents as abscissas, both E.M.F.'s and currents varying at the given frequency and between the given extremes.

60. CHARACTERISTIC, STATIC, OF A CONDUCTOR.—This is the relation given by the curve plotted between the impressed electromotive force as

ordinates and the resultant current through the conductor as abscissas, for substantially stationary conditions.

61. CHOKING COIL.—" A coil with so great a self-induction that its impedance depends chiefly on the self-induction rather than upon the resistance " (I.E.C.). Generally called a Reactance Coil in U.S.A.

62. CIRCUIT, CLOSED OSCILLATING.—A circuit in which the capacity and inductance in series are localised substantially in different places, and which has very small power of radiating electromagnetic waves.

63. COEFFICIENT, ATTENUATION, RADIO.—See Attenuation.

64. COEFFICIENT OF AMPLIFICATION.—See Amplification.

65. COEFFICIENT OF COUPLING, INDUCTIVE.—The ratio of the effective mutual inductance of two circuits to the square root of the product of the effective self-inductances of each of these circuits.

66. CODE.—A system of conventional characters designed to represent letters by dots and dashes. The International Morse Code is official.

67. COHERER.—A form of detector (q.v.). An imperfect contact or collection of such contacts so arranged that when under the influence of an alternating potential it coheres and allows current from a local battery to pass and make some kind of signal. A device sensitive to radio frequency energy, and characterised by (1) a normally high resistance to currents at low voltages, (2) a reduction in resistance on the application of an increasing electromotive force, this reduction persisting until eliminated by the application of a restoring or disturbing mechanical force, and (3) the substantial absence of thermo-electric or rectifying action.

68. COMMUNICATION RADIO.—The transmission of signals by means of electromagnetic waves originating in a constructed circuit.

69. COMPASS RADIO.—A radio receiving device for determining the direction (or the direction and its opposite) in which maximum energy is received ; or

A radio transmitting device for determining the direction (or the direction and its opposite) of maximum radiation.

70. CONDENSER.—A material system possessing electrostatic capacity. Two conducting surfaces separated by a dielectric.

71. CONDENSER, AIR.—A condenser having air as its dielectric.

72. CONDENSER, COMPRESSED GAS.—A condenser having compressed gas as its dielectric.

73. CONDUCTOR CAGE.—See Cage Conductor.

74. CONTINUOUS CURRENT.—A term recommended by the I.E.C. to supersede " direct current " as a description of " an electric current in one direction and sensibly steady or free from pulsation. Abbreviated CC."

75. CONTINUOUS WAVES.—The term applied to waves radiated from an aerial in which oscillations are sustained. Continuous waves may have successive half periods of equal amplitude, or the amplitude may vary within small limits without detriment to their use for wireless telegraphy.

76. CONTROL ELECTRODE OF THERMIONIC VALVE.—See Grid.

77. CONVECTION CURRENT.—A transfer of electrical energy by separate charged particles.

78. CONVERTER, ROTARY.—A machine for converting electrical energy of one form of current to electrical energy of another form, such as from alternating current to continuous or *vice versa*.

79. CORONA.—See Brush or Coronal Losses.

80.—COUNTERPOISE.—A system of electrical conductors forming one portion of a radiating oscillator the other portion of which is the antenna. In land stations, a counterpoise forms a capacitive connection to ground.

81. COUPLER.—An apparatus which is used to transfer radio frequency energy from one circuit to another by associating portions of these circuits.

82. Coupler, Capacitive.—An apparatus which, by electric fields, joins portions of two radio frequency circuits, and which is used to transfer electrical energy between these circuits through the action of electric forces.

83. Coupler, Direct.—A coupler which magnetically joins two circuits having a common conductive portion.

84. Coupler, Inductive.—An apparatus which by magnetic forces oins portions of two radio frequency circuits.

85. Coupling.—The connection between two circuits enabling energy to be transferred from one to the other. The connection may be by magnetic linkage, electrostatic linkage, direct connection, or any combination of these.

86. Coupling, Coefficient of, in inductively coupled system is the ratio of the mutual inductance of the two circuits to the square root of the product of the self-inductance of the circuits. The coefficient of coupling (k) between two circuits tuned to the same frequency and then coupled, is also given by the formula :—

$$\kappa = \frac{\lambda_1^2 - \lambda_2^2}{\lambda_1^2 + \lambda_2^2}$$

where $\lambda_1 \lambda_2$ are the longer and shorter resulting natural wave-lengths of the coupled system.

87. Critical Resistance.—That resistance which is just sufficient to prevent free oscillation in an electrical circuit. If L inductance,

C Capacity, then Critical Resistance $= \sqrt{4\frac{L}{C}}$.

88. Crystal Detector.—A detector which uses the rectifying properties of the contact between a crystal and a metal surface or between two crystals.

89. Current, Damped Alternating.—An alternating current whose amplitude progressively diminishes. (Also called oscillating current.)

90. Current, Forced Alternating.—A current, the frequency and damping of which are equal to the frequency and damping of the exciting electromotive force. See further, Current, Free Alternating.

Note 1.—During the initial stages of excitation, both free and forced currents co-exist.

91. Current, Free Alternating.—The current following any transient electromagnetic disturbance in a circuit having capacity, inductance, and *less* than the critical resistance. See further, Resistance, Critical.

92. Curve, Distribution, of a Radio Transmitting Station for a given distance.—This is a polar curve the radii vectores of which are proportional to the field intensity of the radiation at that distance in corresponding directions. See also Compass, Radio.

Note 1.—The distribution curve depends, in general, not only on the form of the antenna, but also on the nature of the ground surrounding the station.

Note 2.—The distribution curve generally varies with the distance from the station.

93. Curve, Resonance, Standard.—A curve the ordinates of which are the ratios of the square of the current at any frequency to the square of the resonant current, and the abscissas are the ratios of the corresponding wave-length to the resonant wave-length ; the abscissas and ordinates having the same scale.

94. Cyclogram.—See Characteristic Dynamic.

95. Cyclograph.—An instrument for the production of cyclograms.

96. Cymometer.—A " wave-measurer." See Wave-meter.

97. Damping.—The diminution of energy in an electrical circuit resulting from loss of energy.

98. Damping Factor (of a simple circuit).—The ratio of the effective resistance of that circuit to twice the effective inductance (the reciprocal of a time). This term applies only to circuits capable of carrying free alternating currents.

99. Decrement.—See Decrement, Linear, and Logarithmic.

100. Decrement, of a Linearly Damped Alternating Current.—This is the difference of successive current amplitudes in the same direction divided by the larger of these amplitudes.

Note.—Let I_n and I_{n+1} be successive current amplitudes in the same direction of a linearly damped alternating current.

Then, the linear decrement, which is not a constant but varies with the amplitude,

$$b=\frac{I_n-I_{n+1}}{I_n}$$

Also: $I_t=I_0\ (1-bft)$,
where I_0=initial current amplitude,
I_t=current amplitude at time t,
f=frequency of alternating current,
$b=(I_0-I_1)\ I_0$.

101. Decremeter.—An instrument for measuring the logarithmic decrement of a circuit or of a train of electromagnetic waves.

102. Detector.—That portion of the receiving apparatus which, connected to a circuit carrying currents of radio frequency, and in conjunction with a self-contained or separate indicator, translates the radio frequency energy into a form suitable for operation of the indicator. This translation may be effected either by the conversion of the radio frequency energy, or by means of the control of local energy by the energy received.

103. Device, Acoustic Resonance.—A device which utilises in its operation resonance to the audio frequency of the received signals.

104. Dielectric.—Any medium which will only allow of electric conduction to a small or negligible extent.

105. Dielectric Constant (or Specific Inductive Capacity) of a medium. The ratio of the capacity of a condenser having that medium as a dielectric to the capacity of a condenser having a vacuum dielectric, but otherwise identical. (The dielectric constant of air is substantially unity, and therefore for all practical purposes air may be used in place of the vacuum in the comparison condenser.)

106. Dielectric Hysteresis.—That lagging property of a dielectric which is measured by the energy lost when the rising and falling (displacement current)—(Voltage) characteristics (dynamic) are not identical.

107. Dielectric Hysteretic Constant of a given dielectric. The value of the dielectric hysteresis per cycle per unit of potential gradient applied to the dielectric.

108. Diffraction is the deviation of the direction of propagation of a wave from the normal to the wave front at the point where the waves pass the edge of an obstruction. The amount of diffraction depends on the wave-length and increases with increase of wave length.

109. Diplex Telegraphy is the simultaneous transmission or the simultaneous reception of two messages at the same station.

110. Direct Coupling.—When one circuit is linked to another in such a way that a portion of the one forms part of the other they are said to be direct-coupled. An example is provided in the auto-jigger (*vide* Jigger), in which a portion of the inductance is common to two circuits.

111. Direction Finder, Wireless.—A receiving instrument which, in combination with a special aerial system, enables the direction of the transmitting station to be determined.

112. Disc Discharger, Asynchronous.—A disc discharger the speed of which has no fixed relation to the frequency of the current charging the condenser which it discharges.

113. Disc Discharger, Synchronous.—A disc discharger usually directly coupled to the alternator supplying power to the condenser. It may discharge the condenser, one, two, three, or more times during a half-period; or every one, two, or more half-periods. The usual practice is to discharge once every half-period, at the moment when the condenser potential is a maximum, and the alternator current zero.

114. Disruptive Voltage.—The voltage required to break down a piece of dielectric between a given pair of electrodes.

115. Discharger.—That piece of apparatus in the primary oscillating circuit at which the spark takes place.

116. Duplex Telegraphy.—Is the transmission of a message and the reception of a message simultaneously at the same station.

117. Displacement Current.—The electrical condition within a dielectric region of varying electric stress. It produces the same external electric and magnetic effects as the equivalent conduction current.

118. Dynatron.—A three-electrode thermionic tube which depends for its action on the liberation of electrons from the anode by electronic bombardment.

119. Earth Connection, or "Earth."—The connection to the earth which in most systems forms the lower extremity of the Aerial System (q.v.). It usually takes the form of a system of metal plates or wires, or a combination of both, more or less deeply buried in the ground. (U.S. equivalent, Ground.)

120. Eddy Currents.—Those induced in conducting masses by external varying magnetic fields, the location of these currents being primarily determined by the position of the fields and not by the configuration of the conducting masses. (That is, the conducting mass is not specially arranged to provide perfectly well-defined circuits.) Such parasitic currents are also called Foucault currents. They can be minimized by using stranded or laminated conductors.

121. Electric Potential is defined as the work done in carrying a unit charge of electricity from infinity to the point considered. (See Electromotive Force.)

122. Electric Stress.—The cause of the electrically strained condition in the medium between two regions which are at different potentials.

123. Electromagnetic Wave.—A progressive disturbance characterised by the existence on the wave front of electric and magnetic forces acting in directions which are perpendicular to each other and to the direction of propagation of the wave.

124. Electromotive Force.—The force which tends to displace electricity, and is equal to the difference of potential between the points considered.

125. Electron.—The natural unit of negative electricity ($4{\cdot}774 \times 10^{-10}$ electrostatic units).

126. Endodyne Reception.—See Autodyne Reception.

127. Ether.—The medium assumed by electromagnetic theory in order to explain the translation of energy at finite speed by electro-magnetic waves.

128. Excitation, Impulse.—A method of producing free alternating currents in an excited circuit in which the duration of the exciting current is short compared with the duration of the excited current.

Note.—The condition of short duration implies that there can be no appreciable reaction between the circuits.

129. Factor, Damping.—The product of the logarithmic decrement and the frequency of an exponentially damped alternating current.

Let I_0 = initial amplitude,
I_t = amplitude at the time t,
ε = base of Napierian logarithms (2.718+)
α = damping factor.
Then, $I_t = I_0 \varepsilon^{-\alpha t}$.

130. FACTOR, FORM.—The form factor of a symmetrical antenna for a given wave-length is the ratio of the algebraic average value of the R.M.S. currents measured at all heights to the greatest of these R.M.S. currents.

NOTE 1.—For a given R.M.S. current at the base of the antenna, the field intensity at distant points is proportional to the form factor times the height of the antenna.

NOTE 2.—The effective height (height of centre of capacity) is equal to the form factor times the actual height of the antenna.

NOTE 3.—The limiting values of the form factor for various types of antennas are as follows:

	LINEAR OR VERTICAL ANTENNA	FLAT TOP UMBRELLA ANTENNA
Long Waves	Lower Limit, 1/2	Upper Limit, 1
Fundamental	Lower Limit, $2/\pi$	———

NOTE 4.—The form factor varies in a given antenna at various wave-lengths due to variation of the current distribution.

131. FILAMENT BATTERY OF THERMIONIC VALVE.—The battery by which the filament is electrically heated to incandescence.

132. FILAMENT OF THERMIONIC VALVE.—A thin conductor of metal (usually tungsten in modern valves) or carbon which when rendered incandescent emits electrons.

133. FORCED ALTERNATING CURRENT.—One produced in *any* circuit by the application of an alternating electromotive force.

134. FREE ALTERNATING CURRENT.—That produced by an isolated electrical displacement in a circuit having capacity, inductance, and less than the critical resistance.

135. FREQUENCY.—A term used in connection with any form of rhythmical motion or rhythmical change, denoting the number of complete movements or changes in a given time—usually a second.

136. FREQUENCIES, AUDIO (ABBREVIATED A.F.).—The frequencies corresponding to the normally audible vibrations. These are assumed to lie below 10,000 cycles per second.

137. FREQUENCIES, RADIO (ABBREVIATED R.F.)—The frequencies higher than those corresponding to the normally audible vibrations, which are generally taken as 10,000 cycles per second. See also Frequencies, Audio.

NOTE.—It is not implied that radiation cannot be secured at lower frequencies, and the distinction from audio frequencies is merely one of definition based on convenience.

138. FREQUENCY CHANGER.—See Changer, Frequency.

139. FREQUENCY, GROUP.—The number per second of periodic changes of amplitude or frequency of an alternating current.

NOTE 1.—Where there is more than one periodically recurrent change of amplitude, or frequency, there is more than one group frequency present.

NOTE 2.—The term "group frequency" replaces the term "spark frequency."

140. FREQUENCY METER.—An instrument which indicates frequency.

141. FREQUENCY TRANSFORMER.—See Changer, Frequency.

142. FUNDAMENTAL FREQUENCY.—The lowest frequency to which an electrical circuit will resonate.

143. FUNDAMENTAL OF AN ANTENNA.—This is the lowest frequency of free oscillations of the unloaded antenna. (No series inductance or capacity)

144. FUNDAMENTAL WAVE LENGTH.—The wave-length corresponding to the lowest free period of any oscillator.

145. GAP, MICROMETER.—A device for protecting any apparatus from excessive potentials, and consisting of a short gap designed for fine adjustment.

146. GRID OF THERMIONIC VALVE.—Is a perforated metal electrode by means of which it is possible (by suitable charging) to disturb the state of the electric field between the filament and the metal anode and so control the value of the thermionic current.

147. GRID CIRCUIT OF THERMIONIC VALVE.—The circuit which includes the space in the valve from grid to filament and the path of the external conductor from filament to grid.

148. GRID CONDENSER.—A partially insulated condenser placed in the grid circuit of a thermionic valve which, on account of the approximately unilateral conductivity of the grid circuit, produces assymmetrical variations of anode current for symmetrical applied grid voltage changes.

149. GROUND.—A conductive connection to the earth.

150. GROUP FREQUENCY.—The number of distinguishable alternating current groups occurring per second in an electrical circuit.

NOTE 1.—The group referred to above is, in general, mainly a free alternating current which is substantially damped to extinction before the beginning of the following group or train.

NOTE 2.—The pitch of the note in the receiving station is, in general, determined by the group frequency at the transmitting station.

NOTE 3.—The term "Group Frequency" replaces the term "Spark Frequency."

151. HARD VALVE.—A two or three-electrode valve of extreme exhaustion.

152. HARMONIC FREQUENCY.—The harmonics of any particular frequency are generally understood to be all higher frequencies which are odd, or even multiples of the said frequency. An electrical oscillator which has uniformly distributed inductance and capacity (a straight wire nearly fulfils these conditions) will resonate to any odd or even multiple of its fundamental frequency according to whether one end is earthed or not. If the inductance and capacity are not uniformly distributed the circuit may resonate to a number of frequencies higher than its fundamental, but these higher frequencies will not necessarily bear any whole multiple relation to the fundamental frequency.

153. HEIGHT, EFFECTIVE, OF AN ANTENNA.—See Factor, Form; Note 2.

154. HETERODYNE.—A receiver for continuous waves using the principle of reaction between locally generated oscillations and the received oscillations in order to produce beats.

155. HETERODYNE WAVEMETER.—A valve oscillator the oscillatory circuit of which is calibrated in wave-lengths. Syntony between the calibrated and experimental circuits is obtained by tuning until no beats are heard.

156. HIGH-FREQUENCY RESISTANCE.—The resistance offered by a conductor to the passage of high-frequency currents.

It is always greater than the resistance for direct current because of the unequal current distribution over a section of the conductor when carrying high-frequency currents.

157. HIGH-TENSION BATTERY.—The battery used in the anode circuit of a thermionic valve.

158. HYSTERESIS.—A property of a substance or body by virtue of which an effect produced in a body by changing conditions lags behind the conditions. In the case of iron carried through a magnetic cycle, the magnetisation lags behind the magnetising force.

159. IMPEDANCE.—Total opposition to current flow in a circuit in which the current is varying, and is numerically equal to the square root of the sum of the squares of the ohmic resistance and the total reactance of the circuit.

160. INDUCTANCE.—That property of a material system by virtue of which it is capable of storing energy electromagnetically.

The inductance of a system is dependent upon its geometrical dimensions and the permeability of the surrounding media. In hysteresis-free circuits inductance is measured by the ratio of the energy stored in the magnetic field surrounding a current-carrying conductor to the square of the current in that conductor, for stationary conditions. In any circuit, it may be measured by the interlinkage with the system itself of magnetic lines of force due to unit current passing through the system. An alternative method involves the measurement of the counter-electromotive force at the terminals of the given conductor when the current through the conductor changes at the rate of one unit of current per second. In hysteresis-free circuits these three methods of measurement yield identical results.

161. INDUCTANCE, EFFECTIVE, OF AN ANTENNA.—See Capacity, Effective, of an Antenna.

162. INDUCTION COIL.—A piece of apparatus which makes use of the phenomena of induction to transform an intermittent current of comparatively low voltage to an alternating current of high voltage.

163. INDUCTIVE COUPLING.—Two circuits so arranged that some of the lines of force from one passing through the other circuit are inductively coupled.

164. IMPULSE EXCITATION.—See Excitation, Impulse.

165. INTERFERENCE.—The interaction of two alternating currents or of electro-magnetic waves under conditions such that they oppose each other.

166. INTERFERENCE (IN RECEPTION).—The introduction of undesired signals, either from other stations or from Atmospherics (q.v.), into a receiver which is engaged in the reception of a message ; often referred to as "jamming."

167. INTERFERENCE, WAVE (IN RADIO COMMUNICATION).—The reinforcement or neutralisation of waves arriving at a receiving point along different paths from a given sending station (to be distinguished from ordinary or station interference, which is the simultaneous reception of signals from two or more stations).

168. IONISATION OF A GAS.—The breaking away from the molecules of the ions contained in them, thus rendering the gas conductive.

Ionisation in gases may be brought about by various ionising agents—*e.g.*, X-rays, ultra-violet light, or high-speed electrons.

169. IONISATION BY COLLISION.—The liberation of electrons from the atoms of a gas due to the collisions between the atoms and high-speed electrons.

170. JAMMING.—See Interference (in Reception).

171. JIGGER.—The transformer used in coupled circuits. The primary and secondary form part of the primary and secondary circuits respectively. If the transformer has part of the winding common to both primary and secondary, it is called an Auto-Jigger.

172. KATHODE.—" (*a*) In an electrolytic cell. The conductor through the surface of which the current leaves the electrolyte.

" (*b*) In a primary cell. The conductor (generally carbon) through which the current leaves the electrolyte.

" (*c*) The electrode by which the current leaves a cell or other apparatus, such as a vacuum tube or thermionic valve."

173. KEY (MANIPULATING) (OPERATING).—A switch arranged for easy manual operation.

174. KEY, RELAY.—See Relay Key.

175. LENGTH, WAVE.—See Wave Length.

176. LINE OF FORCE.—A curve described in an electric or magnetic field such that the direction of the electric or magnetic force at any point of that curve is a tangent to the curve.

177. **Loading Coil.**—A coil possessing self-inductance inserted in an aerial circuit to increase the natural wave-length of the circuit.

178. **Losses, Brush or Corona.**—See Brush or Corona Losses.

179. **Low-Tension Battery.**—See Filament Battery.

180. **Magnetic Field Intensity.**—The number of lines of force per unit area.

181. **Magnetic Force.**—At a point. The force acting on a unit magnetic pole placed at that point. It is numerically equal to the field intensity in a medium of unit permeability.

182. **Magnetic Hysteresis.**—That property of a magnetic medium which is measured by the energy losses when the rising and falling (magnetomotive force—induction), *i.e.* (H—B), dynamic characteristics are not identical.

183. **Magnetomotive Force.**—A force tending to produce a magnetic flux.

184. **Magnetic Detector (Marconi's).**—A detector of oscillations depending on the effect on the hysteresis of iron.

185. **Microphone.**—A variable resistance, usually in the form of an electrical contact, whose resistance is varied with and in a proportional manner to the movement or pressure of one part. Thus if the movement or pressure is produced by sound waves acting on a diaphragm which is connected to the moving member of the microphone, an electrical current will be produced in the circuit containing the microphone and a battery, whose amplitude varies in a similar manner to the movement of the diaphragm.

186. **Mutual Inductance** of two circuits is the mutual potential energy of the circuits when unit current is flowing in each.

187. **Natural Frequency.**—Is the frequency with which a circuit will oscillate when supplied with energy and then left to itself. If

R = resistance
L = inductance
C = capacity
N = frequency per second

$$\text{then } N = \frac{1}{2\pi}\sqrt{\frac{1}{LC} - \frac{R^2}{4L^2}}$$

188. **Natural Frequency of Antenna.**—See Capacity, Effective, of an Antenna.

189. **Note or Tone Tuning.**—A receiver is tuned to the note of the transmitter when a circuit or part of the indicator is designed to resonate to the spark frequency.

190. **Oscillating Valve.**—A thermionic valve in a circuit which is electrically unstable and generating continuous oscillations.

191. **Oscillations.**—See alternating Currents, Free and Forced, also Current, Damped Alternating.

192. **Oscillator, Arc.**—See Arc Oscillator.

193. **Oscillograph.**—" An apparatus for observing or recording quickly varying currents or potential differences " (B.E.C.).

194. **Period, Periodic Time.**—" Any varying quantity which repeats its values regularly at equal time-intervals is said to be periodic, and the time-interval of one repetition is called the periodic time or period " (B.E.C.).

195. **Permeability** of a medium.—The ratio of the magnetic flux density produced in that medium by a given magnetomotive force to the magnetic flux density produced by the same magnetomotive force in vacuum (or, for practical purposes, in air).

196. **Phase.**—" (*a*) In an operation which recurs periodically the stage or state to which the operation has proceeded.

" (*b*) In an operation which recurs periodically the fraction of the whole period which has elapsed, measured from some fixed origin " (B.E.C.).

197. **Phase Difference.**—" The difference of phase (usually reckoned in time or in angle) between two periodic quantities which vary harmonically. Each of the circuits of a polyphase apparatus is sometimes called a phase " (B.E.C.).

198. **Plain Aerial.**—An early form of transmitter in which the spark gap was placed directly in series with aerial and earth, so that the only condenser in which the energy of the transmitter could be stored was the capacity of the aerial to earth.

The term is also applied to the receiving circuit when the detector is placed directly in series with the receiving aerial and earth.

199. **Plate.**—See Anode.

200. **Plate Circuit.**—Is the circuit in a thermionic valve which includes the space in the valve from plate to filament and the path through the external conductors from filament to plate.

201. **Pliodynatron.**—A combination of a pliotron and a dynatron, being a four-electrode thermionic tube. The output is controlled by the control grid which is between the filament and the heavier grid-anode.

202. **Pliotron.**—A three-electrode valve of extreme exhaustion.

203. **Polarisation** of a wave.—A wave is said to be plane polarised when its electric and magnetic displacements are confined to two fixed planes at right angles.

When the plane of the electric and magnetic displacement rotates uniformly with time, the waves are said to be circularly or eliptically polarised.

Such waves result from the compounding of two plane polarised waves having the same frequency and line of propagation but different relative phases and polarised in different planes.

204. **Potentiometer.**—An instrument for adjusting at will the potentia between any two parts of a circuit.

An instrument for measuring potential difference.

205. **Potential.**—See Electrical Potential.

206. **Power.**—The amount of work done in unit time.

207. **Power, Apparent.**—In an alternating electric circuit this is the product volts × ampères.

208. **Power Factor.**—" The ratio of the watts to the voltampères. In the case of voltage and current of sine form the power factor is cos φ " (B.E.C.). In an oscillating circuit cos $\varphi = \frac{\delta}{\pi}$ where δ is the decrement.

209. **Quenched Spark.**—A spark whose duration is shortened by conditions at the discharger designed to increase rapidly the resistance at the spark gap is said to be " quenched."

210. **Radiation Resistance.**—The resistance which multiplied by the square of the R.M.S. current in the aerial equals the energy lost by the aeria in radiation.

211. **Radiation, Sustained.**—See Waves, Sustained.

212. **Radiogram.**—A telegram sent by radio.

213. **To Radiograph (verb).**—To send a radiogram.

214. **Radio Telephone.**—An apparatus for the transmission of speech by radio.

215. **Radio Phone (noun).**—A telephone message sent by radio.

216. **To Radiophone (verb).**—To send a radiophone.

217. **Reactance** of a circuit is a function of the inductance, capacity, and the impressed frequency.

An inductance has reactance $2\pi \times$ frequency $\times$ inductance.
A capacity has reactance

$$\frac{1}{2\pi \times \text{frequency} \times \text{capacity}}$$

An inductance in series with a capacity has reactance equal to the sum of the reactance of the inductance and the reactance of the condenser.

Under conditions of resonance in a circuit the reactance of the capacity neutralises the reactance of the inductance and the resulting reactance is zero.

218. Rectifier.—An apparatus for converting alternating or oscillating currents into continuous current, or into pulses of unidirectional current. Rectifier, Electron.—A device for rectifying an alternating current by utilising the approximately unilateral conductivity between a hot cathode and a relatively cold anode in so high a vacuum that a pure electron current flows between the electrodes. See also Kenetron.

219. Rectifier, Gas.—An electron rectifier containing gas which modifies the internal action by the retardation of the electrons or the ionisation of the gas atoms.

220. Reflection of Electromagnetic Waves.—(1) When a wave reaches the interface between two media of different dielectric constants its energy does not wholly pass from one medium to the other, but in part remains in the first medium in a reflected wave which travels back from the interface. When the dimensions of the separating surface are large compared with the wave-length the laws of reflection of electromagnetic waves are in general the same as for light.

(2) When waves are being guided by a conductor, such as a wire which has a certain inductance and capacity per unit length, any abrupt change in the value of these constants (such as are produced by inserting an inductance coil, or occur at the end of the wire) causes the production of alternating potentials which result in a wave which travels along the wire in the opposite direction. This second wave is also called a reflected wave.

221. Refraction.—The change in the direction of a wave propagation when passing from one medium to another.

222. Regenerative or Retroactive Amplification.—Amplification obtained in a thermionic valve by causing the energy variations of the anode circuit to feed back into the grid circuit and thus increase the voltage operating on the grid.

223. Relay.—An apparatus by means of which a current, too small to perform a required work, is made to control a larger and adequate current.

224. Relay, Electron.—A device provided with means for modifying the pure electron current flowing between a hot cathode and a relatively cold anode placed in as nearly as possible a perfect vacuum.

These means may be, for example, an electric control of the pure electron current by variation of the potential of a grid interposed between the cathode and the anode.

225. Relay, Gas.—An electron relay containing gas which modifies the internal action by the retardation of the electrons or the ionization of the gas atoms.

226. Relay Key.—An electrically operated key. See further, Key.

227. Resistance.—The measure of that property of a conductor by the action of which electrical energy is transformed into heat in that conductor. It is numerically equal to the ratio of the heat energy liberated per second, measured in watts, to the square of the current in the circuit, for stationary conditions; it is also equal to the ratio of the applied electromotive force to the resulting current, both being constant.

228. Resistance, Antenna.—See Antenna Resistance.

229. Resistance, Critical, of a Circuit.—That resistance which determines the limiting condition at which the oscillatory discharge of a circuit passes into an aperiodic discharge.

230. Resistance, Effective, of a Spark.—The ratio of the power dissipated by the spark to the mean square current.

231. Resistance, Radiation.—This is the ratio of the total energy radiated (per second) by the antenna to the square of the R.M.S. current at a potential node (generally the ground connection). See further, Antenna, Resistance.

232. Resistance, Radio Frequency.—This is the ratio of the heat produced per second in watts to the square of the R.M.S. current (R.F.) in ampères in a conductor.

233. Resonance.—Resonance of a circuit to a given exciting alternating E.M.F. is that condition due to variation of the inductance or capacity in which the resulting effective current (or voltage) in that circuit is a maximum.

Note 1.—Instead of varying the inductance and capacity of a circuit the frequency of the exciting field may be varied. The condition of resonance is determined by the frequency at which the current (or voltage) is a maximum.

Note 2.—The resonance frequency corresponds the more accurately to the frequency of the free oscillations of a circuit, the lower the damping of the exciting alternating field and of the excited circuit.

A circuit will resonate to an impressed frequency when the reciprocal of 2π times the square root of the product of inductance and capacity is equal to the impressed frequency and provided that its resistance is less than the critical resistance. Under conditions of resonance the amplitudes of successive half-periods of the resultant current gradually increase to a maximum which is dependent only on the impressed electromotive force and the resistance of the circuit, including radiation.

234. Resonance, Acoustic Device.—See Device, Acoustic Resonance.

235. Resonance Curve.—A curve showing the relation between the current or voltage induced in an oscillatory circuit and the inducing frequency.

236. Resonance, Sharpness of.—See Tuning, Sharpness of.

237. Retroactive Amplification.—See Regenerative Amplification.

238. Root-Mean-Square Value.—R.M.S. value of an alternating or oscillating current or voltage is the value given by the square root of the mean of the squares of the successive values throughout the half-period.

In a current or voltage of strict sine-wave form (sinusoidal) the R.M.S. value is equal to the maximum multiplied by ·707—*i.e.*, $(1/\sqrt{2})$. The R.M.S. value is also called the effective or virtual value.

239. Selectivity.—The power of a receiving system to discriminate between a number of simultaneous signals.

240. Self-Inductance of a circuit.—That portion of the inductance which is due to the magnetic field produced by the current in that circuit. See also Inductance.

241. Sharpness of Tuning.—The measure of the rate of diminution of current in transmitters and receivers with detuning of the circuit which is varied.

If d_2 is the decrement of the free alternating current in the circuit and d_1 the decrement of the exciting E.M.F., then the sharpness of tuning is arbitrarily defined as $\frac{\pi}{d_1+d_2}$.

In the case of continuous oscillations this reduces to $\frac{\pi}{d_2}$.

242. Sheath.—The anode or plate of a thermionic valve.

243. Shock Excitation.—A name given to the method of exciting oscillations in the aerial circuit by a sudden and very short transference of energy from another circuit.

244. Shortening Condenser.—A condenser inserted in series with an aerial circuit to decrease the natural wave-length of the circuit.

245. Skin Effect of Varying Currents.—The non-uniform current density through the cross-section of the conductor. It is greatest at the surface and least at the centre.

246. Soft Valve.—A two or three electrode valve containing an appreciable amount of gas.

247. Space Charge.—The electric charge possessed by the electrons or positive ions situated in the vacuous space between the electrodes of a discharge tube or thermionic valve.

248. Spark.—An electrical discharge across a gap. It may consist of one discharge in either direction, but generally consists of a number of rapid oscillatory discharges.

249. Specific Inductive Capacity.—See Dielectric Constant.

250. Static.—Disturbances caused by atmospheric charging of the antenna.

Note.—When it is definitely known that disturbances are due to atmospheric charging of the antenna, the word "Static" shall be used. In general, disturbances shall be called "Strays."

251. Strays.—Electromagnetic disturbances set up by distant charges.

252. Syntony and Syntonisation.—The adjustment of one circuit to another, or of one transmitter taken as a whole to one receiver taken as a whole, in such a way that their time-periods are the same and waves of a different time-period produce little or no effect on the system.

253. Telegraphy, Radio.—The art of sending and receiving radiograms.

254. Telephony, Radio.—The art of sending and receiving radiophones.

255. Thermionic Current.—The current passing through a vacuous space and consisting of electrons or ions emitted by an incandescent electrode.

256. Thermionic Valve.—A vacuum tube with incandescent filament and auxiliary electrodes which may function as an amplifier, detector or generator of electrical oscillations.

257. Ticker, Tikker.—A rapid make-and-break device used in conjunction with a resonant circuit and a pair of telephones as a receiver for continuous waves. It discharges the condenser of the resonant circuit at every make. The speed of the make-and-break device has no relation to the wave frequency.

258. Tone Wheel.—A high-speed commutator used as a receiver for continuous waves. It is run at a speed slightly different from the synchronous speed for the wave frequency and in effect converts the high-frequency current into a current of audible frequency.

259. Train of Waves.—The waves produced by one discharge of the primary condenser in a spark circuit.

260. Transformer.—A stationary induction apparatus for transferring energy from one circuit to another by the medium of magnetic energy.

It may or may not transform the current into another current at different potential. In present radio practice the term should be restricted to audio frequency transformers. See Frequency, Audio.

261. Transmission, Diplex.—See Diplex Transmission.

262. Tuner.—An apparatus made in a convenient form, which in conjunction with a detector provides all necessary circuits and adjustments for selective tuning.

263. Tuning.—The process of securing the maximum indication by adjusting the time period of a driven element. See Resonance.

264. Tuning, Sharpness of.—See Sharpness of Tuning.

265. Undamped Waves.—See Continuous Waves.

266. Vacuum Tube, Three Electrode.—As examples see Relays, Electron and Gas.

267. **Vacuum Tube, Two Electrode.**—As examples see Rectifiers, Electron and Gas.

268. **Valve, Fleming.**—A detector for oscillations. It depends on the rectifying properties of the ionised space between a hot filament and a cold electrode in an exhausted vessel.

269. **Valve, Thermionic.**—See Thermionic Valve.

270. **Waves, Electromagnetic.**—A periodic electromagnetic disturbance progressive through space.

271. **Wave Length.**—Twice the distance (taken in the line of propagation of the wave) between two successive points of zero disturbance; or the distance between two consecutive maxima, of the same sign. The wave-length is numerically equal to the velocity of the waves divided by the frequency.

272. **Wave Length (of an Electromagnetic Wave).**—The distance in metres between two consecutive maxima of the same sign. The wave-length is numerically equal to the velocity of the waves (3×10^{10} cms. per second) divided by their frequency.

273. **Wave-Length, Fundamental.**—See Fundamental Wave-Length.

274. **Wave-Length, Natural.**—In a loaded antenna (that is, with series inductance or capacity) the natural wave-length corresponds to the slowest free oscillation.

275. **Wave Changer.**—See Changer, Wave.

276. **Wave Meter.**—A radio frequency measuring instrument calibrated to read wave-lengths.

277. **Waves Sustained.**—Waves radiated from a conductor in which an alternating current flows.

278. **Wave Train.**—See Train of Waves.

279. **Wing Circuit.**—See Anode Circuit.

(B) Foreign Equivalents

ENGLISH.	FRENCH.	ITALIAN.	SPANISH.	GERMAN.
Accumulator batteries	Batterie d'accumulateurs	Batterie di accumulatori.	Acumuladores, Baterias de	Accumulatoren Batterie
Aerial, balancing	Antenne de compensation	Antenna di compensazione	Antena compensadora	Wage Antenne
Aerial, directional	Antenne dirigée	Antenna dirigibile	Antena dirigida	Gerichtete Antenne
Aerial, direction-finder	Antenne réception dirigée	Antenna, rivelatrice della direzione	Antena para busca de direcciones	Antenne, zur Entdeckung der Richtung
Aerial, horizontal	Antenne horizontale	Antenna orizzontale	Antena horizontal	Horizontaler Luftleiter
Aerial, receiving	Antenne de réception	Antenna di ricezione	Antena de recepcion	Empfangsdraht
Aerial, transmitting	Antenne d'émission	Antenna di trasmissione.	Antena de transmission	Geberdraht (Sendeluftleiter)
Aerial, umbrella	Antenne en parapluie	Antenna a forma di ombrella	Antena de paragua en forma	Schirmnetz
Ammeter, a.c.	Ampèremètre pour courant alternatif	Amperometro per corrente alternata	Amperimetro, c.a.	Wechse stromamperemeter
Ammeter, d.c.	Ampèremètre pour courant continu	Amperometro per corrente continua	Amperímetro, c.c.	Gleichstromamperemeter
Ammeter, hotwire	Ampèremètre à fil chaud.	Amperometro a filo caldo	Amperímetro térmico	Hitzdrahtamperemeter
Ammeter, moving coil	Ampèremètre d'Arsonval	Amperometro a bobina mobile	Amperímetro de bobina movil	D'Arsonvalscher Amperemeter
Amplifier, thermionic	Amplificateur à lampes	—	—	Vakuum - röhren Verstärker
Angle divider	Diviseur d'angle	Divisore di angoli	Divisor de Angulo	WinkelTrennungs-Apparat
Antenna.	Antenne	Antenna	Antena.	Luftleiter (Antenne)
Antenna, horizontal extension of	Branche horizontale de l'antenne	Fili orizzontali dell' antenna	Antena, Prolongación horizontal de la	Horizontale Verlangerungsdrahte des Luftleiters
Antenna, T-shaped	Antenne en T.	Antenna a forma di T.	Antena en forma de T.	T. formige Antenne
Antenna, extended T-shaped	Antenne en T. à branches horizontales prolongées	Antenna a forma di T. allungata	Antena en forma de T. prolongada	Verlängerte T. Luftleiter
Apparatus, receiving	Appareils de réception	Apparecchi di ricezione	Aparatos receptores	Empfanger
Apparatus, transmitting	Appareils de transmission	Apparecchi di trasmissione	Aparatos transmisores	Sender
Arrester, earth terminal	Eclateur de mise à terre	Morsetto per presa di terra	Espacio de chispa de tierra	Unterbrochener Erdanschlusz
Arrester, lightning	Parafoudre	Dispositivo scaricafulmine	Pararrayos	Blitzschutz
Atmospherics	Perturbations atmosphériques	Perturbazioni atmosferiche	Perturbaciones Atmosféricas	Luftstoerungen
Battery of Leyden jars	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Bateria de Botellas de Leyden	Batterie Leydener Flaschen
	Sonnerie d'appel	Campanello di chiamata.	Timbre de Llamada	Lockklingel

English	French	Italian	Spanish	German
Blower, electric motor	Soufflerie à moteur électrique	Ventilatore ad azionamento elettrico	Motor soplador or Ventilador eléctrico	Geblaese mit Elektrischen Antrieb
Busbars, main-	Barres omnibus principales	Barre collettrici principali	Barras colectoras principales	Haupt Sammelschienen
Building, station-	Bâtiment du poste radiotélégraphique	Fabbricato della stazione	Edificio de la estación	Stationhaus
Buzzer	Vibrateur	Vibratore	Zumbador	Summer
Buzzer, practice	Vibrateur d'apprentissage	Cicala per la pratica della ricezione a udito	Zumbador para prácti	Ubungssummer
Capacity	Capacité	Capacità	Capacidad	Aufnahmefähigkeit
Cart, radiotelegraph	Voiture radiotélégraphique	Carro radiotelegrafico	Carro de radiotelegrafía	Funkenkarren
Change of connections for receiving	Commutation pour la réception	Commutazione per ricezione	Cambio de conexiones para la recepción	Umschaltung auf Empfangen
Change of connections for transmitting	Commutation pour la transmission	Commutazione per trasmissione	Cambio de conexiones para la transmisión	Umschaltung auf Senden
Chokes, air core protecting	Bobine de réactance sans noyau de fer	Bobine di protezione a nucleo d'aria	Bobinas de reactancia, protectoras, de núcleo de aire	Impedanzspulen fur hohe Frequenz mit Luftkern
Choking coil	Bobine d'impédance	Rocchetto d'autoinduzione	Bobina de reactancia	Drosselspule
Circuit breaker and closer	Disjoncteur et conjoncteur automatique	Interruttore	Interruptor con apertura y cierre automáticos	Strom - unterbrecher und Strom-schliesser
Circuit, closed oscillating	Circuit oscillant fermé	Circuito oscillante chiuso	Circuito oscilante cerrado	Geschlossener Erregerkreis
Circuit, intermediate	Circuit intermédiaire	Circuito intermedio	Circuito intermedio	Zwischenkreis
Circuit, open radiating	Circuit radiant ouvert	Circuito radiante aperto	Circuito radiador abierto	Offener Strahlungskreis
Circuit, oscillatory	Circuit oscillatoire	Circuito oscillante	Circuito oscilante	Schwingungskreis
Coherer	Cohereur	Ricevitore a coherer	Cohesor	Fritterempfänger
Coil, syntonising	Inductance de syntonisation	Rocchetto di sintonizzazione	Bobina de sintonización	Abstimmspule
Commutator	Commutateur	Commutatore	Conmutador	Stromwender
Commutator (of Dynamo)	Collecteur	Collettore	Colector	Stromwender
Condensers	Condensateurs	Condensatori	Condensadores	Kondensatoren
Condenser, adjustable	Condensateur règlable	Condensatore regolabile	Condensador variable	Variabler Kondensator
Condenser, adjustable disc	Condensateur à disque	Condensatore a disco regolabile	Condensador de disco, variable	Drehkondensator
Condenser, aerial tuning	Condensateur de syntonisation d'antenne	Condensatore per la sintonizzazione dell' antenna	Condensador de sintonización de la antena	Kondensator zur Luftleiterabstimmung
Condenser, air	Condensateur à air	Condensatore ad aria	Condensador de dialéctrico de aire	Luftkondensator
Condenser, calibration	Condensateur étalon	Condensatore per tarature	Condensador para calibración	Eichungskondensator
Condenser, circuit	Circuit du condensateur	Circuito del condensatore	Condensador, Circuito de	Kondensatorkreis
Condenser, intermediate circuit	Condensateur du circuit intermédiaire	Condensatore per il circuito intermedio	Condensador del circuito intermedio	Kondensator im Zwischenkreis

English.	French.	Italian.	Spanish.	German.
Condenser, secondary circuit	Condensateur du circuit secondaire	Condensatore per il circuito secondario	Condensador del circuito secundario	Kondensator im Secundärkreis
Condenser, short wave .	Condensateur de raccourcissement	Condensatore per onda corta	Condensador de onda corta	Verkürzungskondensator
Condenser-system . .	Système de condensateur	Sistema di condensatori .	Sistema de Condensadores	Kondensatorsystem
Condensers, test-tube .	Condensateurs à tube .	Condensatori tubolari .	Tubo para ensayo de condensadores	Kondensator Prüfröhre
Condenser, twin-coupled .	Condensateur jumelé .	Condensatore a doppio accoppiamento	Condensador de doble acoplamiento	Kondensator, doppelt geschaltete
Condensers, variable .	Condensateurs réglables .	Condensatori variabili .	Condensadores variables.	Variablerkondensatoren
Converter . . .	Commutatrice . .	Convertitore . .	Convertidor . .	Drehumformer
Continuous wave . .	Onde entretenue . .	Onda continua . .	Onda continua . .	Kontinuierlische Welle
Continuous wave receiver .	Recepeur pour ondes entretenues	Ricevitore d' onde non smorzate	Receptor para onda continua	Empfanger fuer kontinuierlische Welle
Coupling	Couplage	Accoppiamento . .	Acoplamiento . .	Kopplung
Couplings, flexible and insulating	Manchons d'accouplement souples et isolants	Accoppiamenti elastici ed isolanti	Acoplamientos flexibles y ai ladores	Biegsame und isolierende Verbindungen
Current, alternating .	Courant alternatif . .	Corrente alternata .	Corriente alterna . .	Wechselstrom
Current, direct . .	Courant continu . .	Corrente continua . .	Corriente continua .	Gleichstrom
Current, primary alternating	Courant alternatif primaire	Corrente alternata del circuito primario	Corriente alterna primaria	Primär Wechselstrom
Cut-out, automatic . .	Interrupteur automatique	Interruttore automatico .	Interruptor automático .	Selbstunterbrecher
Cymometers . . .	Cymomètres . . .	Cimometri . . .	Cimómetro . . .	Wellenmesser
Damper . . .	Sourdine . . .	Sordina . . .	Amortiguador . .	Dämpfer
Damping, high . .	Amortissement élevé .	Forte smorzamento .	Amortiguamiento, Gran .	Grosse Dämpfung
Decremeter . . .	Décrémètre . . .	Decrimetro . . .	Decrémetro . . .	Dekremeter (Dampfungsmesser)
Detector, crystal . .	Détecteur à cristal .	Rivelatore di onde a cristallo	Detector de cristal .	Krystalldetektor
Detector, balanced crystal	Détecteur à cristal équilibré	Rivelatore a cristalli compensati	Detector de cristal compensador	Wellenanzeiger, bilanzierten Kristall
Detector, Fleming valve .	Récepteur à valve d'oscillation " Fleming "	Rivelatore di onde con valvola di Fleming	Detector de Válvula, Fleming	Prof. Fleming's Valve-Empfänger
Detector, magnetic . .	Détecteur magnétique .	Rivelatore di onde magnetico	Detector magnético .	Marconi-Magnetdetektor
Detector, thermo-electric .	Détecteur thermo-éléctrique	Rivelatore di onde termoelettrico	Detector termoeléctrico .	Thermo-elektrischer-detektor

Dielectric strength	Rigidité diélectrique	Rigidità dielettrica	Resistencia dieléctrica	Dielektrische Festigkeit
Discharger, asynchronous	Eclateur asynchrone	Scaricatore asincrono	Descargador asincrono	Scheibenfunkenstrecke, asynchron
Discharger, disc, high-speed	Eclateur à disque à grande-vitesse	Scaricatore a disco ad alta velocitá	Descargador de disco de gran velocidad	Schnell rotierende Scheibenfunkenstrecke
Discharger, disc, smooth	Eclateur à disque uni	Scaricatore a disco a contorni lisci	Descargador de disco liso	Rotierende Scheibenfunkenstrecke-glatt
Discharger, disc, studded	Eclateur à disque—muni de prisonniers latéraux	Scaricatore a disco con punte	Descargador de disco dentado	Rotierende Scheibenfunkenstrecke mit Zähne
Discharger, fixed	Eclateur fixe	Scaricatore fisso	Descargado fijo	Scheibenfunkenstrecke, fixierter
Discharger, micrometric spark	Eclateur à étincelle micrométrique	Scaricatore per la produzione di scintilla micrometrica	Descargador de chispa micrométrica	Mikrometerfunkenstrecke
Discharger, side electrodes	Eclateur à électrodes latérales	Scaricatore con elettrodi laterali	Descargador, electrodos laterales del	Scheibenfunkenstrecke, Seiten electroden
Discharger, synchronous	Eclateur synchrone	Scaricatore sincrono	Descargador sincrono	Scheibenfunkenstrecke, synchron
Duplex telegraphy	Télégraphe duplex	Telegrafia duplex	Telegrafía duplex	Duplex Telegraphie
Earth connection	Connexion de terre	Messa a terra	Conexión de tierra	Erd Verbindung
Efficiency	Rendement	Rendimento	Rendimiento	Wirkungsgrad
Frequency, high	Haute fréquence	Alta frequenza	Frecuencia, alta	Hochfrequenz
Frequency, low	Basse fréquence	Bassa frequenza	Frecuencia, baja	Niedfrequenz
Frequency meter	Fréquencemètre	Frequenziometro	Frecuencímetro	Frequenzmesser
Generating plant	Générateur	Impianto generatore	Instalación generadora	Stromanlage
Generator, c.c.	Dynamo	Generatore di corrente continua	Generador de corriente continua	Dynamo (Gleichstrom)
Grid	Grille	—	—	Gitter
Hammer-break, magnetic	Interrupteur à marteau	Interruttore magnetico a martello	Interruptor magnético de martillo	Magnetischer Hammerunterbrecher
Inductance, aerial	Inductance d'antenne	Induttanza dell' antenna	Inductancia de antena	Antenneninduktanz
Inductance, aerial tuning	Inductance à syntoniser le circuit de l'antenne	Induttanza per la sintonizzazione dell' antenna	Inductancia de sintonización de la antena	Induktanz zum Syntonisieren der Antenne
Inductance, low frequency	Bobine d'inductance du circuit à basse fréquence	Induttanza per il circuito a bassa frequenza	Inductancia del circuito de baja frequencia	Induktanzspule niedriger Frequenz
Inductance, primary	Inductance primaire	Induttanza per circuito primario	Inductancia primaria	Primärinduktanz

English.	French.	Italian.	Spanish.	German.
Inductance, primary syntonising	Inductance primaire de syntonisation	Induttanza sintonizzatrice del circuito primario	Inductancia primaria de sintonización	Primärinduktanz zum Abstimmen
Inductance, variable primary syntonising	Inductance primaire variable de syntonisation	Induttanza sintonizzatrice del circuito primario, regolabile	Inductancia variable de sintonización del primario	Veränderliche Primärinduktance zum Abstimmen
Induction coil. . .	Bobine d'Induction .	Rocchetto d'induzione .	Bobina de inducción .	Rhumkorffscher Funkeninduktor
Inkwriter, Morse . .	Appareil Morse enregistreur	Ricevitore scrivente Morse	Aparto Morse registrador	Schreibempfänger
Insulation . . .	Isolation . . .	Isolamento . . .	Aislamiento . . .	Isolierung
Insulator, leading-in .	Isolateur d'entrée . .	Isolatore d'entrata. .	Aislador de entrada .	Isolator, Einfuehrungs
Insulator, flexible . .	Isolateur souple . .	Isolatore elastico . .	Aislador flexible . .	Flexibler Isolator
Insulator, receiving . .	Isolateur de réception .	Isolatore dell' antenna di ricezione	Aislador para circuito receptor	Isolator fur den Empfangsdraht
Insulator, transmitting .	Isolateur de transmission	Isolatore dell' antenna di transmissione	Aislador para circuito transmisor	Isolator fur die Senderantenne
Interrupter . . .	Rupteur . . .	Interruttore . . .	Interruptor . . .	Unterbrecher
Interrupter, current- .	Rupteur de courant .	Interruttore di corrente .	Interruptor de corriente .	Stromunterbrecher
Interrupter, electrolytic .	Rupteur électrolytique .	Interruttore elettrolitico.	Interruptor electrolítico .	Wehnelt Unterbrecher
Interrupter, turbine .	Turbo-rupteur à mercure	Interruttore a turbina .	Interruptor de turbina .	Quecksilberturbinen-unterbrecher
Jigger	Transformateur d'oscillations	Trasformatore delle correnti oscillatorie	" Jigger " . . .	Jigger, Selbst-induktion des Erregerkreises
Jigger, balanced . .	Jigger compensé . .	Trasformatore ad alta frequenza compensato	Jigger compensador .	Jigger, bilanzierter
Jigger, primary . .	Primaire de transformateur d'oscillation	Circuito primario del transformatore delle correnti oscillatorie	" Jigger," primario del .	Primär-Jigger
Jigger, secondary . .	Secondaire de transformateur d'oscillation	Circuito secondario del trasformatore delle correnti oscillatorie	" Jigger," secundario del	Sekundär-Jigger
Key-sending . . .	Manipulateur . .	Tasto manipolatore di trasmissione	Manipulador . .	Taste
Lamp, tuning—and choke	Lampe de Syntonisation avec bobine de réactance	Lampada di sintonizzazione con bobine	Lámpara de sintonización y de reactancia	Syntonisierlampe mit Impedanz

Leyden jar	Bouteille de Leyde.	Bottiglia di Leida	Botella de Leyden	Leydener Flasche
Leyden jar, battery of	Batterie de bouteilles de Leyde	Batteria di bottiglie di Leida	Botellas de Leyden, Bateria de	Batterie Leydener Flaschen
Lightning arrester. (*See* Arrester, lightning)				
Mast, portable	Mât, portatif.	Albero, portatile	Mástil, portátil	Tragbarer Mast
Masts, steel sectional	Mâts d'acier à sections	Albero di acciaio diviso in sezioni	Mástil de secciones de acero	Stahlmasten in Teilen
Mast, telescopic	Mât, télescopique	Albero telescopico	Mástil telescópico	Teleskopmast
Microphone apparatus	Appareil microphone	Apparecchio microfonico	Aparato microfónico	Microphon-Apparat
Micrometer, spark	Micromètre à étincelle	Micrometro per Scintilla	Micrometro de chispa	Funkenmikrometer
Motor alternator disc set	Groupe moteur alternateur avec éclateur à disque	Gruppo convertitore con scaricatore a disco	Grupo de motor, alternador con estallador de disco	Wechselstromgenerator kombiniert mit Rotierende Funkenstrecke
Multiple transmission and reception	Transmission et réception multiples	Trasmissionee Ricezione multipla	Transmisión y recepción múltiple	Vielfach Ubermittlung und Empfang
Oscillations, electric	Oscillations électriques	Oscillazioni elettriche	Oscilaciones eléctricas	Elektrische-Schwingungen
Oscillating valve	Oscillateur à lampes	—	—	Röhrensender
Overload	Surcharge	Sovraccarica.	Sobrecarga	Überlast
Plant, radiotelegraphic	Installation radiotélégraphique	Impianto radiotelegrafico	Instalación radiotelegráfica	Radiotelegraphische Anlage
Plate	Plaque, Anode	—	—	Anod, Platte
Potentiometer	Potentiometre	Potenziometro	Potenciómetro	Potentiometer
Radiogoniometer	Radiogoniomètre	Radiogoniometro	Radiogonometro	Radiogoniometer
Range	Portée	Portata	Alcance	Reichweite
Receiver	Appareil récepteur	Apparecchio ricevitore	Receptor	Empfänger
Receiver arrangement	Dispositif de réception	Dispositivo di ricezione	Dispositivo de recepcion	Empfangsvorrichtung
Receiver, balanced	Récepteur compensé	Rivelatore compensato	Receptor compensador	Empfanger, bilanzierter
Receiver, flexible	Récepteur souple	Ricevitore flessibile	Receptor flexible	Empfänger
Receiver, vacuum valve	Récepteur à valve d'oscillation	Ricevitore con valvola a vuoto	Receptor de válvula de vacio	Vakuum ventil Empfänger
Rectifiers	Rectificateurs	Raddrizzatori di corrente	Rectificador	Ausgleicher
Relay	Relais	Soccorritore	Relevador	Relais
Relay H.T.	Relais pour haute tension	Soccorritore ad alta tensione	Relevador A.T.	Hochspannungrelais
Relay magnets	Aimants du relais	Magneti di soccorritore	Imanes del relevador	Relais-magnete
Resistance, high	Haute résistance	Alta resistenza	Resistencia, alta	Hoher Widerstand
Resistance, low	Basse résistance	Bassa resistenza	Resistencia, baja	Niedriger Widerstand
Resistance, starting	Rhéostat de démarrage	Reostato di avviamento	Reostato de arranque	Anlasser
Resistance regulating	Rhéostat de champ	Reostato di campo	Resistencia de regulación	Regulierwiderstand

English.	French.	Italian.	Spanish.	German.
Room, accumulator (battery)	Salle des accumulateurs	Stanza per la batteria di accumulatori	Sala de acumuladores (Batería)	Akkumulatorenraum
Room, operating	Salle de manipulation et réception	Ufficio radiotelegrafico	Sala telegráfica	Bedienungszimmer fur die Drahtloseinstallation
Room, transmitting	Chambre des appareils de transmission	Locale di trasmissione	Sala de manipulacion	Senderraum
Saddles, pack	Selles de paquetage	Basti	Bastes	Packsattel
Screening box	Boîte de garde	Cassetta di protezione	Caja de resguardo	Schutzkasten
Series rheostat	Rhéostat en serie	Reostato in serie	Reostato en serie	Serien Widerstand
Ship station	Station de bord	Stazione navale	Estación de á bordo	Schiffstation
Short circuiting device	Dispositif de mise en court circuit	Dispositivo di messa in corto circuito	Dispositivo de corto circuito	Kurzschliesser
Shunt, highly inductive	Shunt à pouvoir inductif élevé	Shunt ad alta induzione	Shunt altamente inductivo	Shunt mit hohe Selbstinduktion
Shunt, non-inductive	Shunt, non-inductif	Circuito in derivazione non-induttivo	Shunt, no inductivo	Nebenschlusz induktionsfreier
Signals, balancing	—	Segnali equilibrati	Señales compensadores	Balanciersignale
Signals, telephone	Signaux téléphoniques	Segnali del telefono	Señales telefónicas	Telephonsignale
Span	Haubanage	Campata	Tirante	Abspannung
Spark	Etincelle	Scintilla	Chispa	Funke
Spark coil, with hammer-break	Bobine d'induction à interrupteur à marteau	Rochetto d'induzione a martello	Bobina de chispa con interruptor de martillo	Funkeninduktor mit Hammerunterbrecher
Spark gap	Eclateur à étincelle	Oscillatore	Espacio de chispa	Funkenstrecke
Spark gap, micrometric	Eclateur à intervalle micromètique	Oscillatore micrometrico	Espacio micrometrico	Micrometer Funkenstrecke
Spark micrometer	Micromètre à étincelles	Micrometro di scintilla	Micrómetro de chispa	Funkenmikrometer
Spark gap, multiple	Eclateur en série	Oscillatore multiplo	Espacio de chispa múltiple	Unterteilte Funkenstrecke
Spark gap, quenched	Eclateur pour étincelle étouffée	Spinterometro per oscillazioni smorzate	Descargador de chispa extinguida	Gedaempfte Funkenstrecke
Spark quenched	Etincelle étouffée	Scintilla smorzata	Chispa extinguida	Löschfunke
Sparking distance	Distance explosive	Distanza esplosiva	Distancia explosiva	Funkenstrecke
Starter, automatic	Démarreur, automatique	Avviatore automatico	Reostato de arranque, automático	Selbstanlasser
Starter, combined with shunt regulator	Rhéostat de démarrage avec rhéostat de champ	Reostato di avviamento combinato con regolatore in derivazione	Reostato de arranque y regulador de campo combinados	Anlasswiderstand mit Nebenschlussregler

English	French	Italian	Spanish	German
Starter, single-phase .	Démarreur monophasé .	Avviatore per corrente monofase	Reostato de arranque monofásico	Einphasenanlasser
Starter, three-phase. .	Démarreur tri-phasé .	Avviatore per corrente trifase	Reostato de arranque trifásico	Dreiphasenanlasser
Station, aeroplane . .	Aéroplane (poste d') .	Stazione per aeroplano .	Estación para aeroplano .	Flug-zeug Station
Station, airship . .	Station de ballon dirigeable	Stazione per aeronave .	Estación para globos dirigibles	Luftschiffstation
Station, cart type . .	Station du type sur voiture	Stazione del tipo su carri	Estación tipo de carros	Karren station. Fahrbar-station
Station, cavalry . .	Poste de cavalerie . .	Stazione per cavalleria .	Estación de cavalería .	Kavalleriestation
Station, high-power. .	Station à grande puissance	Stazione di grande potenza	Estación de gran potencia	Kraftstation
Station, knapsack . .	Poste dehavresac . .	Stazione da zaino . .	Estación de mochilas .	Tornisterstation
Station, landing . .	Poste de débarquement .	Stazione da sbarco. .	Estación de desembarco .	Landungsstation
Station, long-distance .	Poste de grandes distances	Stazione ultrapotente .	Estación de gran alcance	Radiotelegraphische Grossstation
Station, portable . .	Station portative . .	Stazione portatile . .	Estación portátil . .	Tragbarestation
Station, portable military.	Poste militaire transportable	Stazione militare mobile .	Estación militar portátil.	Tragbare Militärstation
Station, radiotelegraph .	Poste radiotélégraphique	Stazione radiotelegrafica.	Estación radiotelegráfica.	Funkenamt
Station, small-power .	Station à faible puissance	Stazione di piccola potenza	Estación de pequeña potencia	Kleinstation
Swiss commutator . .	Commutateur suisse .	Commutatore tipo svizzero	Conmutador suizo . .	Schweizerische Kommutator
Switch, aerial change-over	Commutateur d'antenne.	Commutatore dell'antenna	Conmutador para cambio de hilos de antena	Luftdrahtumschalter
Switch, aerial heating .	Commutateur, échauffement d'antenne	Interruttore per riscaldamento dell'antenna	Conmutador de seguridad contra calentamiento de la antena	Umschalter zum heizen der Antenne
Switch, automatic . .	Interrupteur automatique	Interruttore automatico .	Interruptor automático .	Selbsttaetiger Schalte
Switch, automatic field break	Interrupteur automatique d'excitation	Interruttore automatico di eccitazione	Interruptor automático del campo	Selbsttaetiger Magnet-ausschalter
Switch, carbon break .	Interrupteur à contacts de charbon	Interruttore a carbone .	Interruptor con contactos de carbón	Kohlenschalter
Switch, change-over .	Commutateur . .	Commutatore . .	Conmutador . . .	Umschalter
Switch, change-tune .	Commutateur de longeurs d'ondes	Commutatore di sintonizzazione	Conmutador de sintoinzacion	Wellenumschalter
Switch, charging . .	Interrupteur de charge .	Interruttore di carica .	Conmutador de carga .	Ladeschalter
Switch, combined fuse and	Interrupteur avec coupe circuit	Fusibile ed interruttore combinati	Interruptor con fusible .	Schalter und Sicherung-kombiniert
Switch, double-bladed knife	Interrupteur bipolaire à lames	Interruttore doppio a coltello	Interruptor de cuchillo, bipolares	Doppelmesserschalter
Switch, double-pole .	Interrupteur bipolaire .	Interruttore bipolare .	Interruptor bipolar .	Zweipoliger Schalter
Switch, double pole, double throw	Commutateur bipolaire à deux directions	Interruttore bipolare a doppio effetto	Conmutador bipolar de dos posiciones	Zweipoliger Umschalter
Switchboard, d.c. and a.c..	Tableau de distribution pour courant continu et alternatif	Quadro di distribuzione per corrente continua ed alternata	Cuadro de distribución de c.a. y c.c.	Schalttafel fuer Gleich und Wechselstrom

ENGLISH.	FRENCH.	ITALIAN.	SPANISH.	GERMAN.
Switch, field-break	Interrupteur de l'excitation	Interruttore ad eccitazione	Interruptor del campo	Magnetausschalter
Switch, high-tension	Interrupteur pour haute tension	Interruttore per alta tensione	Interruptor de alta tensión	Hochspannungschalter
Switch, high-tension remote control	Tèléinterrupteur pour haute tension	Interruttore ad alta tensione comandato a distanza	Teleinterruptor de alta tensión	Hochspannungsfernschalter
Switch, knife	Interrupteur unipolaire a lames	Interruttore a coltello	Interruptor de cuchillo	Messerschalter
Switch, main	Interrupteur principal	Interruttore principale	Interruptor principal	Hauptschalter
Switch, oil-break	Interrupteur à bain d'huile	Interruttore ad olio	Interruptor con baño de aceite	Oelschalter
Switch, press (toggle)	Interrupteur à pression	Interruttore a pressione	Interruptor de tornillo	Druckschalter
Switch, quick-break	Interrupteur à rupture brusque	Interruttore a scatto rapido	Interruptor de rotura brusca	Momentschalter
Switch, single-pole	Interrupteur unipolaire	Interruttore unipolare	Interruptor monopolar	Einpoligerschalter
Switch, three-phase	Interrupteur pour courant tri-phasé	Interruttore tripolare	Interruptor trifásico	Drehstromschalter
Switch, three-way	Commutateur à trois directions	Commutatore a tre vie	Conmutador de tres pasos	3 Wege Umschalter
Switch, voltmeter	Interrupteur du voltamètre	Interruttore per voltometro	Interruptor para voltímetro	Voltmeterumschalter
Switch, wave-changing	Commutateur pour changement de longeur d'onde	Commutatore d'onda	Conmutador de cambio de onda	Wellen Umschalter
Syntonisation	Syntonisation	Sintonizzazione	Sintonización	Abstimmung
Syntonised wireless telegraphy	Télégraphie sans fil syntonisée	Radiotelegrafia sintonica.	Telegrafía sin hilos sintonizada	Abstimmbare Drahtlosetelegraphie
Table, operating	Table de manipulation	Tavola per il servizio radio-telegrafico	Mesa de aparatos	Radiotelegrafischer Bedienungstisch (Apparattisch)
Tapper	Frappeur	Decoherer	Decohesor de martillo	Klopfer
Telegraphy, directional wireless	Radiotélégraphie dirigée.	Radiotelegrafia a sistema dirigibile	Telegrafía sin hilos dirigida	Gerichtete Drahtlose Telegraphie
Transformer	Transformateur	Trasformatore	Transformador	Transformator
Transformer, high-frequency oscillation	Transformateur d'oscillation à haute fréquence	Trasformatore delle correnti oscillatorie ad alta frequenza	Transformador de oscilaciones de alta frecuencia	Umformer fuer Hochfrequenzschwingungen
Transformer, oscillatory	Transformateur d'oscillation	Trasformatore delle correnti oscillatorie	Transformador oscilatorio	Oscillationsumformer

Transmitting arrangement	**Dispositif d'emission**	Dispositivo di trasmissione	Dispositivo de transmision	**Senderanordnung**
Transmitter, cavalry	Transmetteur pour cavalerie	Trasmettitore di stazione per cavalleria	Transmisor para estación de cavaleria	Kavalleriesendeapparat
Transmitter, inductive	Transmetteur à couplage inductif	Trasmettitore ad accopiamento induttivo	Transmisor de acoplamiento de induccion	Gekoppelte Sender
Transmitter, sharply tuned	Transmetteur à syntonisation aiguë	Trasmettitore acutamente sintonizzato	Transmisor de sintonización aguda	Scharf abgestimmte Sender
Transmitter, simple (P.A.)	Dispositif d'emission directe	Trasmettitore semplice	Transmisor sencillo	Einfacher Sender
Tremblers	Trembleurs	Interruttore a martello	Tembladores	—
Trembler, cantilever	—	—	Temblador de canecillo	—
Trench, covered in for wiring	Canalisation souterraine	Fossa coperta per cavi elettrici	Zanja cubierta para cables	Abgedeckter Kabelgraben
Tube, ebonite	Tube en ébonite	Tubo di ebanite	Tubo de ebonita	Ebonitroehre
Tuning	Syntonisation	Sintonizzazione	Sintonización	Abstimmen
Tuning, flat	Syntonisation non aiguë	Sintonizzazione piana	Sintonización aplastada	Unscharfes Abstimmen
Tuner, multiple	Syntonisateur multiple	Sintonizzatore multiplo	Sintonizador múltiple	Vielfach Abstimmapparat
Tuning, note	Hauteur de la note	Sintonizzazione della nota	Sintonización de la nota	Tonhöhe der Abstimmung
Tuning, note and wave	Note et onde de syntonisation	Sintonizzazione della nota e dell' onda	Sintonización de la nota y de la onda	Abstimmen von Tonhöhe und Welle
Tuning wave	Onde de syntonisation	Sintonizzazione della onda	Sintonización de la onda	Welle der Abstimmung
Undamped wave. (*See* Continuous wave)				
Valve	Valve	Valvola	Válvula	Ventil
Valve, vacuum	Valve à vide	Valvola a vuoto	Válvula de vacio	Vakuumventil
Voltage	Voltage	Potenziale	Voltaje	Spannung
Voltmeter, a.c.	Voltmètre pour courant alternatif	Voltometro per corrente alternata	Voltímetro c.a.	Voltmeter fur Wechselstrom
Voltmeter, aperiodic	Voltmètre apériodique	Voltometro aperiodico	Voltímetro aperiodico	Aperiodisches Voltmeter
Voltmeter, d.c.	Voltmètre pour courant continu	Voltometro per corrente continua	Voltímetro c.c.	Voltmeter fuer Gleichstrom
Voltmeter, hotwire	Voltmètre à fil chaud	Voltometro a filo caldo	Voltímetro térmico	Hitzdrahtvoltmeter
Voltmeter, switch	Interrupteur de voltmètre	Interruttore per voltometro	Voltímetro, interruptor para	Voltmeterumschalter
Wagon apparatus	Voiture portant les appareils	Carro per gli apparecchi.	Aparatos sobre carros	Apparatekarren
Wagon, dynamo	Voiture portant le générateur	Carro per il generatore	Dinamo sobre carros	Kraftkarren-Kraftwagen
Wavelength	Longueur d'onde	Lunghezza d'onda	Longitud de onda	Wellenlaenge
Wavemeter	Ondemètre	Ondametro	Ondámetro	Wellenmesser
Waves, radiation of	Radiation des ondes	Irradiamento di onde	Radiación de las ondas	Ausstrahlung der Wellen

GENERAL INFORMATION AND USEFUL TABLES

INTERNATIONAL RULES FOR THE USE OF SYMBOLS REPRESENTING QUANTITIES IN MATHEMATICAL CALCULATIONS

(*a*) Instantaneous values of electrical quantities which vary with the time to be represented by small letters. In case of ambiguity, they may be followed by the subscript "t."

(*b*) Virtual or constant values of electrical quantities to be represented by capital letters.

(*c*) Maximum values of periodic electrical and magnetic quantities to be represented by capital letters followed by the subscript "m."

(*d*) In cases where it is desirable to distinguish between magnetic and electric quantities, constant or variable, magnetic quantities to be represented by capital letters of either script, heavy-faced or any special type. Script letters to be only employed for magnetic quantities.

(*e*) Angles to be represented by small Greek letters.

(*f*) Dimensionless and specific quantities to be represented, wherever possible, by small Greek letters.

THE "MILE" EQUIVALENTS OF VARIOUS NATIONS

	English Yards.
Arabian mile	2,148
Bohemian mile	10,137
Brabant mile	6,082
Burgundy mile	6,183
Chinese li	629
Danish mile	8,244
Dutch mile	6,395
English mile, statute	1,760
English mile, geographical	2,025
Flemish mile	6,869
French posting league	4,263
French marine league	6,075
French legal league of 2,000 toises	4,263
German mile, geographical	8,100
German mile, long	10,126
German mile, short	6,859
Hamburg mile	8,244
Hanoverian mile	11,559
Hesse mile	19,547
Hungarian mile	9,115
Irish mile	2,240
Italian mile	2,025
Poland mile, short	6,071
Poland mile, long	8,100
Portuguese legoa	6,760
Prussian mile	8,237
Roman mile, modern	2,028
Russian verst	1,167
Saxon mile	9,904

WEIGHTS AND MEASURES

AVOIRDUPOIS WEIGHT.

drachms.	oz.	lb.	qrs.	cwts.	ton.	grammes.
1	= ·0625	= ·0039	= ·000139	= ·000035	= ·00000174	= 1·771846
16	= 1	= ·0625	= ·00223	= ·000558	= ·000028	= 28·34954
256	= 16	= 1	= ·0357	= ·00893	= ·000447	= 453·59
7168	= 448	= 28	= 1	= ·25	= ·0125	= 12,700
28672	= 1792	= 112	= 4	= 1	= ·05	= 50,802
573440	= 35840	= 2240	= 80	= 20	= 1	= 1,016,048

TROY WEIGHT.

grains.	dwts.	oz.	lb.	grammes.
1	= ·04167	= ·00208	= ·0001736	= ·0648
24	= 1	= ·05	= ·004167	= 1·555
480	= 20	= 1	= ·0833	= 31·1035
5760	= 240	= 12	= 1	= 373·242

7000 grains troy = 1 lb. avoirdupois.
175 lb. troy = 144 lb. avoirdupois.
lb. avoirdupois × 1·2153 = lb. troy.
lb. troy × ·82286 = lb. avoirdupois.

LONG MEASURE.

in.	feet.	yards.	fath.	poles.	furl.	mile.	metres.
1	= ·083	= ·02778	= ·0139	= ·005	= ·000126	= ·0000158	= ·0254
12	= 1	= ·333	= ·1667	= ·0606	= ·00151	= ·0001894	= ·3048
36	= 3	= 1	= ·5	= ·182	= ·00454	= ·000568	= ·9144
72	= 6	= 2	= 1	= ·364	= ·0091	= ·001136	= 1·8287
198	= 16½	= 5½	= 2¾	= 1	= ·025	= ·003125	= 5·0291
7920	= 660	= 220	= 110	= 40	= 1	= ·125	= 201·16
63360	= 5280	= 1760	= 880	= 320	= 8	= 1	= 1609·315

MEASURE OF CAPACITY.

pints.	gall.	peck.	bushel.	quarter.	wey.	last.	cub. ft.	litres.
1	= ·125	= ·0625	= ·01562	= ·00195	= ·00039	= ·000195	= ·02	= ·5676
8	= 1	= ·5	= ·125	= ·0156	= ·00312	= ·00156	= ·1604	= 4·543
16	= 2	= 1	= ·25	= ·03125	= ·00625	= ·00312	= ·3208	= 9·082
64	= 8	= 4	= 1	= ·125	= ·025	= ·0125	= 1·283	= 36·32816
512	= 64	= 32	= 8	= 1	= ·2	= ·1	= 10·264	= 290·625
2560	= 320	= 160	= 40	= 5	= 1	= ·5	= 51·319	= 1453·126
5120	= 640	= 320	= 80	= 10	= 2	= 1	= 102·64	= 2906·25

1 gallon in wine, ale, or dry measure
= 277¼ cubic inches = ·16 cubic foot
= 10 lb. of distilled water =
Cube feet × 6·2355 = gallons.
Cube ins. × ·003607 = gallons.
1 bushel = 2218·19 cube inches = 1·28 cube foot.
Cube feet = ·78 = bushels.
Cube ins. × ·00045 = bushels.

SQUARE OR SURFACE MEASURE.

144 square inches = 1 square foot.
9 square feet = 1 square yard.
30¼ square yards = 1 square rod or perch.
40 square rods = 1 rood.
4 roods = 1 acre (4,840 square yards).
640 acres = 1 square mile (3,097,600 square yards).

METRIC SYSTEM OF WEIGHTS AND MEASURES

The Metric System is based upon the estimated length of the fourth part of a terrestrial meridian. The ten-millionth part of this arc is called a *Metre*, and is the unit of length. The cube of the tenth part of a metre was adopted as

the unit of capacity, and denominated a *Litre*. The weight of a litre of distilled water at its greatest density was called a *Kilogramme*, of which the thousandth part, or *Gramme*, was adopted as the unit of weight. The multiples of these, proceeding in decimal progression, are distinguished by the employment of the prefixes *deca*, *hecto*, *kilo*, and *myria*, and the subdivisions by *deci*, *centi*, and *milli*. The units in general use are as follows :—

MEASURES OF LENGTH (UNIT METRE).

Equal to	Metre.	Inches.	Feet.	Yards.	Miles.
Millimetre	0·001	0·039	0·003	0·001	0·000
Centimetre	0·010	0·393	0·032	0·010	0·000
Metre	1·000	39·370	3·280	1·093	0·000
Kilometre	1000·000	39370·790	3280·899	1093·633	0·621

CUBIC, OR MEASURES OF CAPACITY (UNIT LITRE).

Equal to	Cubic inches.	Cubic feet.	Pints.	Gallons.
Cubic Centimetre	0·061	0·000	0·001	0·000
Litre, or cubic decimetre	61·027	0·035	1·760	0·220
Cubic Metre	61027·051	35·316	1760·773	220·096

MEASURES OF WEIGHT (UNIT GRAMME).

Equal to	Grains.	Avoirdupois lb.	Cwt. = 112 lb.	Tons = 20 cwt.
Milligramme	0·015	0·000	0·000	0·0000
Gramme	15·432	0·002	0·000	0·0000
Kilogramme	15432·348	2·204	0·019	0·0009
Tonne = 1,000 kilogs. ..		2204·000	19·678	0·9839

SQUARE, OR SURFACE MEASURE.

Equal to	Square feet.	Square yards.
Square Metre	10·7643	1·196

Hectare = 10,000 sq. met. = 11,960 sq. yds. = 2·47 acres.

The Metric System of Weights and Measures, which, as plainly demonstrated in the preceding pages, is logically symmetrical, now forms the usual standard in the following countries :—

*Argentine Republic.
Austria-Hungary.
Belgium.
*Bolivia.
*Brazil.
*Chile.
*Colombia.
Denmark.
Egypt.
France.
German Empire.
†Greece.
Holland.
Italy.
*Mexico.
Norway.
*Peru.
Portugal.
†Roumania.
Servia.
*Spain.
Sweden.

* Old Spanish measures also occasionally used are :—

Onza	=	1·014 ounce avoirdupois.
Libra	=	1·014 lb. avoirdupois.
Quintal	=	101·44 lb. avoirdupois.
Arroba (of 25 libras)	=	25·36 lb. avoirdupois.
Arroba of Wine	=	6·70 Imperial gallons.
Gallon	=	0·74 Imperial gallon.
Vara	=	0·927 yard.
Square Vara	=	0·859 square yard.

† Turkish measures are also in use :—

Oke of 410 drams	=	2·8283 lb. avoirdupois.
Almud	=	1·151 Imperial gallons.
Kileh	=	0·9120 Imperial gallon.
44 okes = 1 Cantar	=	124·3616 lb. avoirdupois.
39·6263 okes	=	1 cwt.
180 okes = 1 Tcheke	=	509·095 pounds.
1 kileh = 20 okes	=	0·36 Imperial quarter.
816 kilehs	=	100 Imperial quarters.

The following countries have not adopted the Metric System :—

CANADA.—The legal Weight and Measures are the Imperial Yard, Imperial pound avoirdupois, Imperial gallon, and the Imperial bushel. By Act 42 Vict., cap. 16, the British hundredweight of 112 pounds and the ton of 2,240 pounds were abolished, and the hundredweight was declared to be 100 pounds, and the ton 2,000 pounds avoirdupois as in United States, but sometimes contracts stipulate for the British weights.

CHINA.—

Weights— 10 Ch'ien = 1 Liang (Tael) = 1·333 oz. avoirdupois or 37·78 grammes
16 Liang = 1 Kin (Catty) = 1·333 lb. avoirdupois or 604·53 grammes
100 Chin = 1 Tan (Picul) = 133·333 lb. avoirdupois or 60·453 kilogrammes
4 ozs. = 3 taels ; 1 lb. = ¾ catty or 12 taels ; 1 cwt. = 84 catties ; 1 ton = 16 piculs 80 catties

Capacity—10 Ko ... ... = 1 Sheng (pint) = 1·031 litre
10 Sheng ... = 1 Tou (peck) = 10·31 litre (holding from 6½ to 10 Kin of rice and measuring from 1·13 to 1·63 gallon)

Commodities, even liquids, such as oil, spirits, etc., are commonly bought and sold by weight.

Length—10 Fen ... = 1 Ts'un (inch)
10 T'sun ... = 1 Chi'h (foot) = 14·1 English inches by treaty
10 Chi'h ... = 1 Chang = 11 ft. 9 in. (141 in. by treaty)
1 Li ... ... = ½ English mile (about)

The mow, the unit of measurement, is almost exactly one-sixth of an acre.

In the tariff settled by treaty between Great Britain and China, the Chi'h of $14\frac{1}{10}$ English inches has been adopted as the legal standard. The standards of weight and length vary all over the Empire, the Chi'h ranging from 9 to 16 English inches, and the Chang (= 10 Chi'h) in proportion ; at the treaty ports, the use of foreign treaty standard of Chi'h and Chang is common.

In October, 1907, a decree for uniform weights and measures was issued, making the K'up'ing or Treasury Scale the standard weight. The K'up'ing tael or ounce weighs 575·64 grains. The Haikwan tael weighs 581·47 grains.

INDIA.—The Maund of Bengal.

40 Seers ... ... = $82\frac{2}{7}$ lb. avoirdupois
The Maund of Madras ... = 25 lb. avoirdupois (nearly).
The Tola ... ... = 180 grains troy
The Guz of Bengal ... = 36 inches

An Act to provide for the adoption of an uniform system of weights and measures was passed in 1871. The Act orders : " Art. 2. The primary standard of weight shall be called a seer, and shall be a weight of metal in the possession of the Government of India, equal, when weighed in a vacuum, to the weight known in France as the kilogramme = 2·205 lb. avoirdupois." " Art. 3. The units of weight and measures of capacity shall be, for weights, the said

seer; for measures of capacity, a measure containing one such seer of water at its maximum density, weighed in a vacuum. Unless it be otherwise ordered, the subdivisions of all such weights and measures of capacity shall be expressed in decimal parts." This Act, however, has never been in operation.

JAPAN.—

The Mommé	= 2·11 drams or 2·41 dwts. or 120 mommé = 1 lb. avoirdupois
The Kin (Catty) = 160 mommé	= 1·322 lb. avoirdupois (0·266 mommé = 1 gramme) or 1·60 lb. troy
The Picul (100 kin)	= 132·27 lb.
The Kwan = 1,000 mommé ...	= 8·261 lb. avoirdupois or 10·04 lb. troy
The Shaku	= ·994 foot (3·3 shaku = 1 metre)
The Kujira-Shaku	= 1·242 feet
The Sün	= 1·193 inches
The Ken = 6 Shaku	= 5·965 feet
The Jo = 10 Shaku	= 9·942 feet
The Chô = 60 Ken	= 357·916 feet, or about $\frac{1}{15}$ mile
The Ri = 36 Chô	= 2·44 miles
The Ri (marine)	= 1·15 mile
The Ri (square)	= 5·9552 square miles
The Chô = 10 tan	= 2·45 acres
The Koku, Liquid = 10 To = 100 Sho	= 39·7033 gallons
The Koku, Dry	= 4·9629 bushels
The Koku (capacity of vessel)	= $\frac{1}{10}$ ton
The To, Liquid	= 3·9703 gallons
The To, Dry	= 1·9851 peck

RUSSIA.—

1 Verst (500 sajènes) ...	= 3,500 feet, or two-thirds of a statute mile
1 Sajène (3 arshins)	= 7 feet
1 Arshin (16 vershok) ...	= 28 inches
1 Square Verst	= 0·43941 square mile
1 Dessiatine	= 2·69972 acres
1 Pound (96 zolotniks = 32 lot)	= $\frac{9}{10}$ of a pound or 14·4 ounces
1 Pood (40 pounds)	= 36·113 lb. = 0·32244 cwt. or 100 poods = 1·6121 tons. Baltic Freight is usually quoted per ton of 62 poods
1 Vedro (8 shtoffs)	= 2¾ Imperial gallons
1 Chetvert (8 chetveriks) ...	= 5·77 Imperial bushels or 46·2 gals.

UNITED STATES.—

British weights and measures are usually employed, but the old Winchester gallon and bushel are used instead of the new or Imperial standards. Different States have a legal standard for bushels of certain articles, such as grain and potatoes, varying from 60 lb. for wheat to 32 for oats.

Wine gallon	= 0·83333 gallon
Ale gallon	= 1·01695 gallon
Bushel...	= 0·9692 Imperial bushel

Instead of the British cwt. a cental of 100 lb. is used. 1 ton = 2,000 lb., except coal, which is usually 2,240 lb. wholesale.

NAUTICAL MEASURES

(*From "Lloyd's Calendar," by permission of the Committee of Lloyd's.*)

12 inches	... = 1 foot	6 feet	... = 1 fathom
3 feet	... = 1 yard	3 nautical miles	... = 1 league

Sea or Nautical Mile = one-sixtieth of a degree of latitude, and varies from 6,046 ft. on the Equator to 6,092 ft. in lat. 60°

Nautical Mile for speed trials, generally called the Admiralty Measured Mile ... { 6,080 feet; 1·151 statute miles; 1,853 metres }

Cable's length = the tenth of a nautical mile; or, approximately, 100 fathoms or 200 yards.

A Knot = a nautical mile an hour, is a measure of speed, but is not infrequently, though erroneously, used as synonymous with a nautical mile.

Length of European Measures of Distances compared with the Nautical Mile of 6,080 *ft.*

	Length in Nautical Miles.		Length in Nautical Miles.
Nautical Mile	1·000	German Ruthen	4·064
British Statute Land Mile ...	0·868	Italian Mile	1·000
Austrian Mile	4·094	Norwegian Mile	6·097
Danish Mile	4·064	Russian Verst	0·576
French Kilometre	0·539	Swedish Mile	5·769
German Geographical Mile ...	4·000		

DISTANCE OF HORIZON AT SEA.

Let h be the height of the observer's eye above sea level, D the distance to the horizon, and R the earth's radius.

Then

$$D^2 = 2Rh$$

And thus D in statute miles $= 1{\cdot}22\sqrt{h}$ in feet

D in kilometres $= 2{\cdot}52\sqrt{h}$ in metres

An object of height h^1 is seen by an eye at height h at a distance D^1 given by

D^1 in statute miles $= 1{\cdot}22 \quad \sqrt{h}$ in feet $+ \sqrt{h^1}$ in feet.

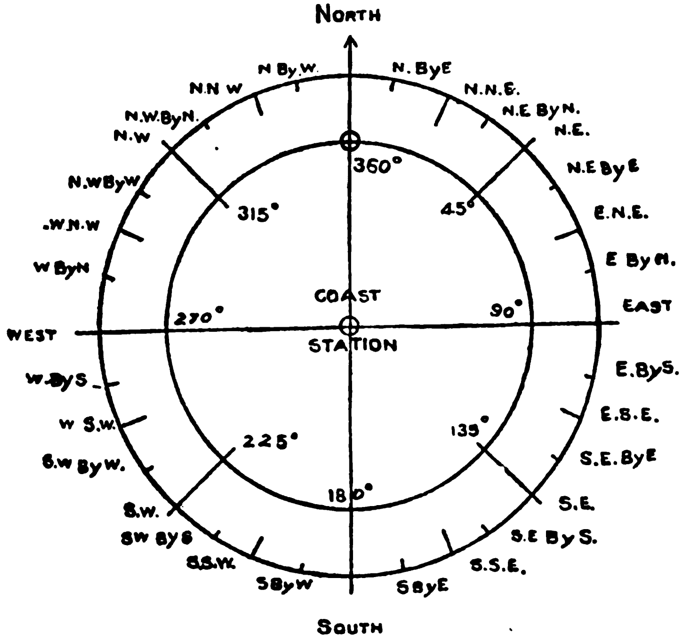
D^1 in kilometres $= 2{\cdot}52 \quad \sqrt{h}$ in metres $+ \sqrt{h^1}$ in metres.

The distance of the horizon—*i.e.*, the greatest distance at which the surface of the sea is visible—varies somewhat with refraction in the atmosphere, but is, on clear days, approximately as below:—

Elevation Feet.	Miles.	Elevation Feet.	Miles.	Elevation Feet.	Miles.
5	2·96	50	9·35	500	29·58
10	4·18	100	13·23	1000	33·40
20	5·92	200	18·72	5280	96·18
		300	22·91		

METHOD OF DENOTING THE TRUE BEARING AND COURSE OF A SHIP AT SEA

As regards the true bearing *of* the ship *from* the coast station, the degrees are reckoned " clockwise " from north round through east, south and west.



Thus, if the ship's *bearing* from the coast station is anything between north and east, the number to be signalled will be between 0 and 90.

Between east and south the number will be between 90 and 180.

Between south and west the number will be between 180 and 270.

Between west and north the number will be between 270 and 360.

Similarly, if the ship's *course* is between N. and E. the number to be signalled will be between 0 and 90.

Between E. and S. the number to be signalled will be between 90 and 180.

Between S. and W. the number to be signalled will be between 180 and 270.

Between W. and N. the number to be signalled will be between 270 and 360.

To facilitate the conversion of the bearing and course into the number of degrees to be signalled, a table is appended in which either the bearing of the ship from the coast station, or the bearing of the coast station from the ship, can be ascertained and the number of degrees to be signalled seen at a glance. The course must be looked for in the same column as the bearing *of* the ship *from* the coast station.

Thus a ship 150 miles bearing S. 75° W. from a coast station and steaming S. 85° E. at 15 knots, and having telegrams comprising 75 words to send, on receiving the signal to Go (▬ • ▬) from the coast station, would signal the following (Rule 22 of Part II) :—

▬ • ▬ • ▬ X Y Z ▬ • • • A B C 150 255

95 15 75 • ▬ • ▬ •

(end).

TABLE TO CONVERT BEARING AND COURSE INTO DEGREES.

Course of Bearing of Ship from Coast Station.	Bearing of Coast Station from Ship.	Degrees to be signalled.
North	South	0°
N. 10° E.	S. 10° W.	10°
20°	20°	20°
30°	30°	30°
40°	40°	40°
50°	50°	50°
60°	60°	60°
70°	70°	70°
80°	80°	80°
East	West	90°
S. 80° E.	N. 80° W.	100°
70°	70°	110°
60°	60°	120°
50°	50°	130°
40°	40°	140°
30°	30°	150°
20°	20°	160°
10°	10°	170°
South	North	180°
S. 10° W.	N. 10° E.	190°
20°	20°	200°
30°	30°	210°
40°	40°	220°
50°	50°	230°
60°	60°	240°
70°	70°	250°
80°	80°	260°
West	East	270°
N. 80° W.	S. 80° E.	280°
70°	70°	290°
60°	60°	300°
50°	50°	310°
40°	40°	320°
30°	30°	330°
20°	20°	340°
10°	10°	350°
North	South	360° or 0

ATOMIC AND ELECTRONIC DATA

The radius of a hydrogen molecule is $1 \cdot 2 \times 10^{-8}$ cms.

The mass of a hydrogen molecule is $3 \cdot 3 \times 10^{-24}$ gms.

The average velocity of a molecule in air at 15° C. is 459 metres per second.

The mean free path of a molecule in air at atmospheric pressure is $1 \cdot 42 \times 10^{-5}$ cms.; in a soft valve of typical pressure ·5 mm. the mean free path is $2 \cdot 16 \times 10^{-2}$ cms.; while in a hard valve of pressure 10^{-6} mm. the mean free path is 12,500 cms.

The number of molecules per cc. at atmospheric pressure is $2 \cdot 75 \times 10^{19}$; thus their average distance apart is 3×10^{-6} cms.

The number of molecules per cc. in a soft valve of pressure ·5 mm. is $1 \cdot 8 \times 10^{16}$; thus their average distance apart is $3 \cdot 8 \times 10^{-6}$ cms.

The number of molecules per cc. in a hard valve of pressure 10^{-6} mm. is $3 \cdot 6 \times 10^{10}$; thus their average distance apart is 3×10^{-4} cms.

The negative charge on an electron is 4·774 electrostatic units or $15 \cdot 91 \times 10^{-20}$ coulombs.

The diameter of an electron is 4×10^{-13} cms.

The mass of an electron is 9×10^{-28} gms.

The velocity of an electron after falling through a potential drop of V volts is $6 \times 10^{7} \sqrt{V}$ cms. per second; thus after falling through a potential of 100 volts the electronic velocity is $6 \times 10^{7} \times \sqrt{100} = 6 \times 10^{8}$ cms. per second.

LENGTH OF A DEGREE IN LATITUDE AND LONGITUDE.

Lat.	Degree of Longitude.		Degree of Latitude.		Lat.	Degree of Longitude.		Degree of Latitude.	
°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.	°	Stat. Miles.	Naut. Miles.	Stat. Miles.	Naut. Miles.
0	69·160	60·000	68·698	59·600	45	48·986	42·498	69·044	59·899
2	·119	59·964	·699	·601	47	47·251	40·993	·068	·920
4	68·992	·855	·702	·603	49	45·459	39·439	·092	·941
6	·783	·673	·706	·607	51	43·611	37·835	·116	·962
8	·491	·419	·712	·612	53	41·710	36·186	·140	·982
10	·116	·093	·719	·618	55	39·758	34·491	·162	60·002
12	67·659	58·697	·728	·625	57	37·756	32·755	·184	·022
14	·120	·229	·738	·634	59	35·797	30·979	·206	·041
16	66·499	57·690	·750	·645	61	33·615	29·164	·228	·059
18	65·797	·081	·764	·657	63	31·481	27·311	·248	·077
20	·015	56·404	·779	·669	65	29·308	25·425	·268	·094
22	64·154	55·657	·795	·683	67	27·100	23·509	·286	·110
24	63·216	54·843	·813	·699	69	24·857	21·564	·302	·124
26	62·201	53·962	·831	·715	71	22·582	19·593	·318	·137
28	61·110	·016	·850	·731	73	20·282	17·597	·333	·149
30	59·944	52·005	·870	·749	75	17·956	15·578	·345	·161
32	58·706	50·931	·892	·767	77	15·607	13·539	·357	·171
34	57·396	49·794	·914	·786	79	13·238	11·484	·367	·179
36	56·016	48·597	·936	·806	81	10·853	9·417	·375	·186
38	54·568	47·340	·959	·826	83	8·456	7·338	·381	·192
40	53·053	46·026	·983	·846	85	6·048	5·248	·387	·196
42	51·473	44·656	69·007	·866	87	3·632	3·151	·390	·199
44	49·830	43·231	·013	·888	89	1·211	1·050	·392	·201

MEASURES OF TIME

The earth's axial rotation is the phenomenon by which time is measured everywhere on the earth's surface. Experiment and observation show that, if we assume the earth to rotate uniformly, there are many other phenomena which are as accurately isochronous in their periodicity. That is to say, they pass again and again through all their phases in exactly the same interval of time as measured in terms of the earth's rotation. In the pendulum of a clock and the balance-wheel of a watch we have such isochronism very approximately realised. A little consideration will convince us that the measurement of time is really a comparison of periodic sequences. We cannot conceive any other mode of marking off time intervals than by some kind of motion of a periodic character. Our practical unit of time is essentially terrestrial.

SIDEREAL DAY.—The standard unit of time is the SIDEREAL DAY, being the period in which the earth turns once round on its axis. It is divided into sidereal hours, minutes, and seconds ; but these measures of time are used by astronomers only.

MEAN SOLAR TIME.—A SECOND is the time of one swing of a pendulum adjusted so as to make 86,164·09 swings in a sidereal day. Seconds are usually subdivided decimally.

One MEAN SOLAR DAY = 24 hours = 1,440 minutes = 86,400 seconds = 1·00273791 sidereal day.

RELATION BETWEEN TIME AND LONGITUDE.—At any given instant the mean solar time at two stations differ by an amount proportional to their difference of longitude, the time at the eastern station being the earlier.

CORRESPONDING DIFFERENCES.

Longitude.	Time.	Longitude.	Time.
15″	1 second.	75°	5 hours.
1′	4 seconds.	90	6 ,,
15′	1 minute.	105	7 ,,
1°	4 minutes.	120	8 ,,
15°	1 hour.	135	9 ,,
30	2 hours.	150	10 ,,
45	3 ,,	165	11 ,,
60	4 ,,	180	12 ,,

To show the exact date of any event, the meridian at which the time is reckoned must be specified. One degree longitude at Equator = 60 nauts = 69·17 statute miles.

STANDARD OR ZONE TIME.

Country.	Central Meridian.	Fast or Slow on Greenwich Time.*
Western Europe, Algeria	0°	Greenwich Time
Central Europe, Tunis, Congo, Angola, German South-West Africa	15° E.	1 h. fast
Eastern Europe, British South Africa, Egypt, Portuguese East Africa	30° E.	2 h. fast
Mauritius, Reunion and Seychelles	60° E.	4 h. fast
India (except Calcutta) and Ceylon	82½° E.	5½ h. fast
Calcutta	90° E.	6 h. fast
Burmah	97½° E.	6½ h. fast
Federated Malay States, Straits Settlements, and French Indo-China	105° E.	7 h. fast
Java	109° 48′ 37·5″ E. ..	7 h. 19 m. 14·5 s. fast
Western Australia, Hong Kong, East Coast of China, Kiau Chau, Philippine Islands, British North Borneo, Labuan	120° E.	8 h. fast
Korea	127° 30′ E. ..	8½ h. fast
Japan, Seoul, and Chemulpo	135° E.	9 h. fast
South Australia and Guam	142° 30′ E. ..	9½ h. fast
New South Wales, Queensland, Tasmania, Victoria, New Guinea, and Caroline Island	150° E.	10 h. fast
New Zealand	172½° E.	11½ h. fast
Ascension	14° 15′ W. ..	57m. slow
Iceland, Madeira, Liberia and Portuguese Guinea ..	15° W.	1 h. slow
America :		
Atlantic (New Brunswick, Nova Scotia, Prince Edward Island, Grenada, Trinidad, etc.) ..	60° W.	4 h. slow
Eastern (Eastern U.S., Chili, Panama, Peru, etc.)	75° W.	5 h. slow
Central	90° W.	6 h. slow
Mountain	105° W.	7 h. slow
Pacific (British Columbia, etc.)	120° W.	8 h. slow
Alaska	135° W.	9 h. slow
Hawaii or Sandwich Islands	157° 30′ W. ..	10½ h. slow
Samoa	172½° W.	11½ h. slow

* Greenwich time is used in France, Spain, Portugal, Belgium, Gibraltar, and the Faroes.

BELL TIME ON BOARD SHIP.

The nautical day begins at noon and is divided into "watches" of four hours each, time being indicated by bells striking every half-hour.

A.M.	A.M.	A.M.		P.M.	P.M.	P.M.
12.30	4.30	8.30	......1 BELL	12.30	4.30	8.30
1.00	5.00	9.00	......2 BELLS......	1.00	5.00	9.00
1.30	5.30	9.30	......3 BELLS......	1.30	5.30	9.30
2.00	6.00	10.00	......4 BELLS......	2.00	6.00	10.00
2.30	6.30	10.30	......5 BELLS......	2.30	6.30	10.30
3.00	7.00	11.00	......6 BELLS......	3.00	7.00	11.00
3.30	7.30	11.30	......7 BELLS......	3.30	7.30	11.30
4.00	8.00	NOON	......8 BELLS......	4.00	8.00	MIDNIGHT.

One of these four-hour watches is divided into two "dog watches" :—

(1) From 4 to 6 p.m.
(2) From 6 to 8 p.m.

The hours for the "dog watches" are :—

4 BELLS..................................	6.00 p.m.
1 BELL	6.30 p.m.
2 BELLS..................................	7.00 p.m.
3 BELLS..................................	7.30 p.m.

CONCISE TABLES OF CONTINENTAL MONEYS.

(*Extracted by permission from Bradshaw's Continental Guide.*)

(1) A Concise Table of Foreign Moneys, Reduced from English into the Currency of Other Countries at Par.

England.	France, Italy, Belgium, Switzerland.	Germany.	Holland.	United States.	Austria in Notes.	Russia in Notes.
£ s. d.	Frs. Cts.	Mks. Pfg.	Fl. Cts.	Dols. Cts.	Kronen.	Roubles.
0 0 0½	0 052	0 04	0 02	0 01	·04	·01
0 0 1	0 104	0 08	0 05	0 02	·08	·03
0 0 2	0 208	0 17	0 10	0 04	·18	·07
0 0 3	0 312	0 25	0 15	0 06	·26	·10
0 0 4	0 416	0 33	0 20	0 08	·38	·14
0 0 5	0 520	0 42	0 25	0 10	·48	·18
0 0 6	0 625	0 50	0 30	0 12	·56	·21
0 0 7	0 729	0 58	0 35	0 14	·66	·25
0 0 8	0 833	0 67	0 40	0 16	·76	·28
0 0 9	0 937	0 75	0 45	0 18	·86	·32
0 0 10	1 040	0 84	0 50	0 20	·96	·36
0 0 11	1 144	0 92	0 55	0 23	1·04	·39
0 1 0	1 25	1 0	0 60	0 25	1·20	·47
0 2 0	2 50	2 0	1 20	0 50	2·40	·95
0 3 0	3 75	3 0	1 80	0 75	3·60	1·42
0 4 0	5 0	4 0	2 40	1 0	4·80	1·90
0 5 0	6 25	5 0	3 0	1 25	6·	2·37
0 6 0	7 50	6 0	3 60	1 50	7·20	2·85
0 7 0	8 75	7 0	4 20	1 75	8·40	3·32
0 8 0	10 0	8 0	4 80	2 0	9·60	3·80
0 9 0	11 25	9 0	5 40	2 25	10·80	4·27
0 10 0	12 50	10 0	6 0	2 50	12·	4·75
0 11 0	13 75	11 0	6 60	2 75	13·20	5·22
0 12 0	15 0	12 0	7 20	3 0	14·40	5·70
0 13 0	16 25	13 0	7 80	3 25	15·60	6·17
0 14 0	17 50	14 0	8 40	3 50	16·80	6·65
0 15 0	18 75	15 0	9 0	3 75	18·	7·12
0 16 0	20 0	16 0	9 60	4 0	19·20	7·60
0 17 0	21 25	17 0	10 20	4 25	20·40	8·07
0 18 0	22 50	18 0	10 80	4 50	21·60	8·55
0 19 0	23 75	19 0	11 40	4 75	22·80	9·02
1 0 0	25 0	20 0	12 0	5 0	24·	9·40
2 0 0	50 0	40 0	24 0	10 0	48·	18·80
3 0 0	75 0	60 0	36 0	15 0	72·	28·20
4 0 0	100 0	80 0	48 0	20 0	96·	37·60
5 0 0	125 0	100 0	60 0	25 0	120·	47·
6 0 0	150 0	120 0	72 0	30 0	144·	56·40
7 0 0	175 0	140 0	84 0	35 0	168·	65·80
8 0 0	200 0	160 0	96 0	40 0	192·	75·20
9 0 0	225 0	180 0	108 0	45 0	216·	84·60
10 0 0	250 0	200 0	120 0	50 0	240·	94·

FOREIGN AND COLONIAL MONEYS WITH APPROXIMATE VALUE IN BRITISH CURRENCY AT NORMAL RATES OF EXCHANGE

Argentine Republic.—Gold coin, 5 dollars. Silver coins, 1 dollar and 50, 20, and 10 centavos. Bronze coins, 2 and 1 centavos. Nickel coins, 20, 10, and 5 centavos. Silver dollar or peso = 4s. Money in circulation is chiefly paper, being converted at 44 cents gold to dollar = 1s. 9d. Gold dollar = 4s.

Australia.—The same as in Great Britain.

Austria-Hungary.—Gold coins, 100 krone = £4 3s. 4d.; 20 krone = 16s. 8d.; 10 krone = 8s. 4d.; Single ducat = 11 crowns 29 heller = 9s. 4½d. Silver

coin, 1 krone = 100 heller = half gulden old coinage = 10d. Exchange about 24 krone to £. Silver gulden or florins (about 12 = £) = 100 kreutzer continue to be legal tender. Nickel, 20 heller = 10 kreutzer of old coinage = 2d., 10 heller = 5 kreutzer of old coinage = 1d. Bronze, 2 heller = 1 kreutzer = ⅕d., 1 heller = ½ kreutzer = $\frac{1}{10}$d.

Belgium.—The same as France.

Bolivia.—100 centavos = 1 boliviano (paper) = about 1s. 7d., or 12½ bolivianos to £. Coins in circulation are—silver, 50, 30, 20, and 10 centavos; nickel, 10 and 5 centavos, and English gold coin. Currency principally paper.

Brazil.—Currency paper, worth 1s. 4½d. per milreis (1,000 reis) or nearly 15 milrei = £1. Silver coinage of 2, 1, and ½ milreis pieces in circulation.

British Honduras.—100 centavos = 1 dollar (gold) = 4s. 1½d. British sovereign (= $4.86) and half sovereign, and U.S. gold coins legal. Silver coins—5, 10, 25 and 50 cents legal tender to $10. Bronze—1 cent. legal tender to 50 cents.

Bulgaria.—Lev (= franc) = 100 stotinki = 9½d. (stotinka = centime). Gold coins, 10 and 20 leva, but foreign 10 and 20 franc pieces principally in circulation. Silver, ½, 1, 2 and 5 leva. Nickel, 2½, 5, 10, 20 stotinki. Bronze, 1, 2, 5, 10 stotinki.

Canada.—1 cent = ½d. 100 cents = 1 dollar = about 4s. 1½d. 4 dollars 86⅔ cents = £ sterling. U.S. gold coins also legal.

Chili.—Gold coins, 20 (colon or condor), 10 (doubloon), and 5 (escudo) peso pieces. Silver coins, 1 peso and ⅕, $\frac{1}{10}$, and ½ of a peso. Bronze coins, ½, 1, 2 and 2½ centavo pieces. Currency is paper—the peso or dollar = about 10d. The restoration of the gold currency is projected under a currency law which was to take effect in 1910, but has been since deferred. Gold peso = 1s. 6d. English sovereign has a legal value of 13⅓ pesos gold.

China.—1,220 (about) cash = 1 haikwan (or customs) tael = about 2s. 8¼d. About 35 cash = 1d. A coin recently issued is the "hundredth of a dollar" worth about $\frac{3}{25}$ of 1d. Silver dollar of same value as Japanese silver yen, is also current. At Hong Kong the dollar (1,000 cash) = about 1s. 11d. and at Shanghai about 2s. 8d. In October, 1908, an Imperial Edict decreed the establishment of a uniform Tael currency—unit silver tael to have a value of between 30d. and 40d.

Cochin China.—5 sapèques or cash = 1 cent; 100 cents = 1 dollar = about 2s.

Colombia.—100 centavos = 1 peso or dollar gold—nominal value 4s. Gold coins, 1, 2½ and 5 dollars. Silver coins, real, peseta, half-dollar and dollar. Very few coins are in circulation, the currency being principally paper, subject to considerable fluctuation. At the legal rate the paper peso = 1 centavo gold, or $500 = £1.

Denmark.—100 Oere = 1 Krone = 1s. 1¼d. 18 Kroner 19 Oere = £ sterling. Gold coins of 20 Kroner and 10 Kroner. Silver, 2 Kroner, 1 Krone, 25 Oere, and 10 Oere.

Egypt.—97½ piastres = £ sterling. 100 piastres, or 1,000 milliemes = £ Egyptian (gold) = £1 0s. 6¼d. Gold circulating is almost exclusively English. 10 milliemes = 1 piastre = about 2½d. Gold piece of 20 francs = about 77 piastres. Silver coins, 1, 2, 5, 10 and 20 piastres; legal tender to £E2.

Eritrea.—1 tallero = 5 Italian lire. Silver coins, 1, 2, 5 talleros.

France.—100 centimes = 1 franc = 9½d. 20 franc piece (Louis or Napoleon) = 15s. 10d. About 25 francs 25 centimes = £ sterling. Gold coins of 5, 10, 20, 50 and 100 francs. Silver coins, 20 centimes, ½, 1, 2, and 5 franc pieces. Nickel coin, 25 centimes. Bronze coins, 1, 2, 5, and 10 centimes.

German Empire.—100 pfennig = 1 mark = about 1s. About 20·45 m. = £ sterling. Gold coins, 20 (doppel-krone), 10 (krone), and 5 (half-krone) marks. Silver coins, 1, 2, 3, and 5 marks and 50 pfennige. Thaler = 3 marks = 2s. 11d. Nickel coins, 20, 10, and 5 pfennige. Bronze coins, 1 and 2 pfennige.

Greece.—100 lepta = 1 drachma paper = 9d. 27 drachmæ 30 lepta = £1 or about 108 drachmæ per 100 fcs. Foreign gold coins in circulation.

Holland.—100 cents = 1 guilder or florin = 1s. 8d. 12 guilders 10 cents = £ sterling. Gold coins, 10 florins (16s.). Silver coins, 2½ guilders (rijks-daaler), 1 guilder, ½ guilder and 25 cents.

India.—£1 = 15 rupees. 16 annas = 1 rupee = 1s. 4d. 3 pie = 1 pice, 12 pie = 1 anna = 1d. Lac of rupees = 100,000. Crore of rupees = 10,000,000.

Italy.—100 centesimi = 1 lira = 9½d. About 25 lire 40 centesimi = £1 sterling. Gold coins, 100, 50, 20, and 10 lire. Silver coins, 5, 2, and 1 lira. Nickel coin, 20 centesimi. Bronze coins, 1, 2, 5 and 10 centesimi.

Italian Somaliland.—Rupia, value L. It. 1.68 (= £1/15 ster.). Silver coins, 1 rupia, ½ rupia, ¼ rupia. Bronze coins, 1 besa (value L. It. 0·0168) 2 besas, 4 besas. 1 rupia is equal to 100 besas.

Japan.—10 rin = 1 sen = ¼d., 100 sen = 1 yen or dollar = 2s. 0½d. Gold coins, 5, 10, and 20 yen. Silver coins, 10, 20, and 50 sen. Nickel coin, 5 sen. Bronze coins, 1 sen and 5 rin. The unit of account is the gold yen.

Lybia.—The same currency as in Italy.

Mexico.—100 centavos = 1 dollar or peso (silver) = 2s. 0½d.

Norway.—100 ore = 1 krone = 1s. 1¼d. Gold coins, 10 and 20 kroner. Exchange 18·19 kroner = £ sterling. Paper money principally used; least value, 5 kroner. Below this amount, silver and copper coins.

Portugal.—100 reis = 1 teston = 4d. 1,000 reis = 1 milreis. Paper milreis = about 4s. 1d. Gold coins, 1, 2, 5, and 10 milreis. Currency, principally paper. Conto = 1,000 milreis. In the Azores, 1 milrei = 3s. 6½d.

Roumania.—1 leu = 100 bani = about 9½d. Gold coins, 5, 10, and 20 lei. Silver, 1 leu, 2 and 5 lei. Nickel, 5, 10 and 20 bani.

Russia.—100 copecks = 1 rouble. Silver or paper rouble = 2s. 1½d. Gold coins—15 roubles (imperial), 10 roubles, 7·50 roubles (half-imperial), 5 roubles. 15 paper roubles = 10 roubles gold = roughly 1 guinea. Currency principally paper.

Servia.—Dinar = 1 franc = 9½d. Gold coins, 10 and 20 dinars. Silver, ½, 1, 2, 5 dinars. Bronze, 5 and 10 paras. Nickel, 5, 10, 20 paras.

Spain.—100 centimos = 1 peseta—about 26·70 pesetas to the £ sterling. Gold coins are 20, 10 and 5 peseta pieces. Silver coins, 1 and 5 pesetas.

Straits Settlement and Malay States.—Gold dollar = 2s. 4d. Silver coins—50, 20, 10 and 5 cent pieces—are legal tender to 2 dollars, but ½ dollar is unlimited tender. Copper coins—1, ½ and ¼ cents—are legal tender to 1 dollar.

SWEDEN.—Krona of 100 ore = 1s. 1¼d. or 18·19 kr. to the £1. Gold little used. Currency for 5 kr. or more mostly paper.

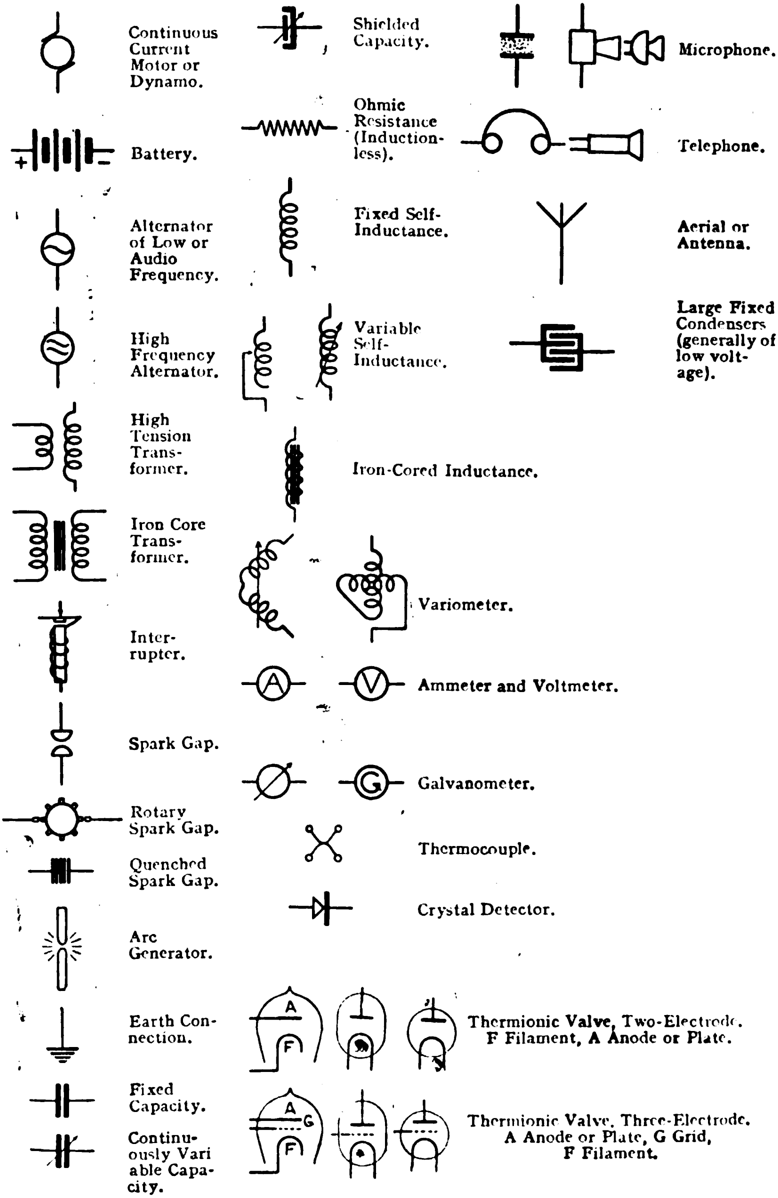
TURKEY.—40 paras = 1 piastre = 2¼d. nearly. 100 piastres = 1 lira turca or gold medjidie = 18s. 109½ pias = £1. "Purse," sometimes used in accounts = 500 piastres or 5 liras and is calculated = £4 10s. od. Value of piastre varies in different parts of the Turkish Dominions. In Syria 1 Turkish £ = 130 local piastres and £1 = 143¼ local piastres.

UNITED STATES.—1 cent = about ½d., 100 cents = 1 dollar = 4s. 1½d. 4 dols. 87 cents = £ sterling. Gold coins, 2½ dollar piece, half eagle (5 dollars), 1 eagle (10 dollars), 1 double eagle (20 dollars).

URUGUAY.—100 centavos = 1 dollar (gold) = about 4s. 3d., or $4·70 = £. Only foreign gold coins (which are legal tender) are in circulation. Silver coins, 10, 20 and 50 cents and 1 dollar. Nickel, 1, 2 and 5 cents.

VENEZUELA.—Medio = about 2½d.; real = about 5d. Monetary unit is silver bolivar = about 9½d., or 1 franc, or 25·25 bols. to the £. Exchange fluctuates slightly from the par, but 25·25 bols. to the £ should be taken as a basis. Currency is based on gold standard—no paper in circulation. Coins are gold, silver and nickel, but principal coin is silver dollar of 5 bols. known as "peso fuerte" or simply "fuerte."

CONVENTIONAL SIGNS USED IN WIRELESS DIAGRAMS



COMPANIES ENGAGED IN THE COMMERCIAL DEVELOPMENT OF RADIOTELEGRAPHY AND RADIOTELEPHONY

PARTICULARS OF THE LEADING COMPANIES ENGAGED IN THE COMMERCIAL DEVELOPMENT OF WIRELESS TELEGRAPHY & TELEPHONY

Amalgamated Wireless (Australasia), Limited

Incorporated.—July 11th, 1913, in the State of New South Wales.

Head Office.—"Wireless House," 97, Clarence Street, Sydney, N.S.W.

Melbourne Office.—422/4, Little Collins Street, Melbourne, Victoria.

New Zealand Office.—"Australasia Chambers," Customs House Quay, Wellington, N.Z.

Directors.—Hon. Sir Thomas Hughes, M.L.C. (Chairman), C. P. Bartholomew, Esq., Ernest T. Fisk, Esq., Alfred Goninan, Esq., James Taylor, Esq., F.C.P.A., Capt. T. Langley Webb.

Managing Director.—Ernest T. Fisk.

Secretary and Assistant Manager.—J. F. Wilson.

Accountant.—F. W. Larkins, A.I.I.A., A.C.I.S.

Factory Manager.—S. M. Grime.

TECHNICAL DEPARTMENT

Superintendent.—G. Apperley.

MARINE DEPARTMENT.

Traffic Manager.—L. L. Meredith.

Equipment Manager.—D. Campbell.

MARCONI SCHOOL.

Superintendent.—V. Gardiner.

MELBOURNE BRANCH.

Melbourne Acting Manager.—H. Firth.

NEW ZEALAND BRANCH.

New Zealand Manager.—J. L. Mulholland.

Capital.—Authorised £200,000. Issued £160,000 in 160,000 shares of £1 each, all fully paid up. Financial year of the Company ends at June 30th. The annual general meeting is held in August.

The Company owns the sole and perpetual licence to use and exploit all Marconi Patents, also all Patents for the Poulsen Pedersen and Quenched Singing Spark Systems in the Commonwealth of Australia, in the Dominion of New Zealand, and in parts of the Pacific and Indian Oceans.

It has a large organisation for manufacturing wireless telegraph apparatus, erection and operation of stations, and the system is installed on over 200 passenger and cargo ships.

The Company also controls The Wireless Press, Sydney, booksellers and publishers of "Sea, Land and Air," with branches at Melbourne (Victoria) and Wellington (N.Z.), and agents and correspondents throughout the world.

Also The Australectric Company, Sydney, manufacturers and suppliers of all descriptions of electrical apparatus, which Company holds a number of important and exclusive agencies.

Accounts.—The accounts are made up to June 30th and December 31st in each year. The profit and loss accounts for the six months ended June 30th, 1919, shows that the gross profit from trading account, radio-telegraphic traffic, ships' subsidies, etc., amounted to £22,296 16s. 11d., and after deducting all expenses (including depreciation amounting to £2,752 5s. 2d.) there was a net profit of £4,207 7s. 3d., from which a dividend at the rate of 5 per cent. per annum was paid for the half-year.

Reserve accounts at June 30th, 1919, stood at £31,727 0s. 2d. Dividends, 1913-14, 4 per cent.; 1914-15, 6 per cent.; 1915-16, 5 per cent.; 1916-17, 5 per cent.; 1917-18, 5 per cent.; 1918-19, 5 per cent.

Chinese National Wireless Telegraph Company (The)

Incorporated.—Under Special Charter by virtue of an agreement dated May 24th, 1919, between The Government of the Republic of China and Marconi's Wireless Telegraph Company, Ltd.

Office.—5, Peh Ch'a Lu Sha, Peking.

Directors.—Lieut.-Gen. Ting Ching (Chairman), Rear-Admiral Chen Ngen Tao, Lin Chih Hsiu, Godfrey C. Isaacs, T. A. Barson, A. H. Ginman (Vice-Chairman and Managing Director).

Secretary.—Sohstu G. King.

Capital.—Authorised £700,000 in 700,000 shares of £1 each.

The Company was formed to manufacture, sell and maintain wireless telegraph and telephone apparatus in China, and has been granted a licence by Marconi's Wireless Telegraph Company, Ltd., giving it the sole right to use in China all the Marconi Company's Patents, present and future, for wireless telegraphy and telephony.

Compagnie D'Exploitation Radio-Electrique (La)

Incorporated.—April 1st, 1919.

Head Office.—79, Boulevard Haussmann, Paris.

Directors.—MM. Bousquet (President), Baron de la Chevrelière (Vice-President), N. Pietri, E. Girardeau, Tronchon, Sins, Dal Piaz, Musnier, Max Robert.

Managing Director.—M. N. Pietri.

Capital.—2,500,000 francs, divided into 25,000 shares of 100 francs each.

The Company owns and operates wireless telegraph apparatus on merchant vessels.

The Company also operates aeroplane wireless stations.

Compagnie Générale de Télégraphie Sans Fil (La)

Incorporated.—February 15th, 1918.

Head Office.—79, Boulevard Haussmann, Paris.

Directors.—H. Bousquet (President), Baron de la Chevrelière (Vice-President), A. L. Atthalin, M. Bloch, A. Dupont, E. Girardeau, Godfrey G. Isaacs, E. May, N. Pietri.

Managing Director.—E. Girardeau

General Manager.—Ernest Sins.

Chief Engineers.—Commander Brenot, Commander Garnier.

Capital.—25,000,000 francs, divided into 50,000 shares of 500 francs each, subscribed and fully paid ; 32,000 Parts Bénéficiaires have also been issued.

The financial year ends December 31st.

The Company has acquired the greater part of the assets of La Compagnie Universelle de Télégraphie et de Téléphonie sans Fil.

Compañía Marconi de Telegrafía Sin Hilos del Rio de La Plata (La)

Incorporated.—August 4th, 1906.

Head Office.—Tornquist Building, 132, San Martin, Buenos Aires, Argentina.

Directors.—Captain Guillermo José Nunes (President), Señor Florence O'Driscoll (Managing Director), Colonel Sir Thomas Holdich, K.C.M.G., K.C.I.E., C.B., Godfrey C. Isaacs, Senatore G. Marconi, G.C.V.O., LL.D., D.Sc., Señor Duncan Munro, Señor J. A. Pilling, Señor Carlos Pereira Pinto, Señor Enrique Schlieper, Sidney St. J. Steadman, Señor Antonio Terrarosa.

Secretary.—Enrique Schlieper.

Treasurer.—J. A. Pilling.

Auditor.—Herbert K. James.

Engineer.—E. Berry.

Capital.—$2,000,000 gold, represented by 250,000 shares of $5 gold each, series "AA," fully paid, and 150,000 Preference shares, 5 per cent. (non-cumulative) of $5 gold each, series "BB," 35 per cent. has been called up on the "BB" shares. The balance is payable in instalments of 10 per cent. with not less than thirty days' notice. The financial year of the Company ends on May 31st.

The Company owns the Marconi patents and patent rights for the Argentine Republic, and has licences from Marconi's Wireless Telegraph Company, Limited, and the Marconi International Marine Communication Company, Limited, to work the Marconi system in the Republics of Argentina, Uruguay, and Paraguay. The Company has the permission of the Government to erect wireless telegraph stations within the territorial limits of the Argentine Republic and on vessels flying the Argentine flag. The Company is constructing a high-power wireless station in the Argentine Republic to communicate direct with a similar station in Europe.

Compañía Nacional de Telegrafía Sin Hilos (La)

Incorporated.—December 24th, 1910.

Head Office.—Calle de Alcalá 43, Madrid.

Branch Offices.—Ronda de la Universidad 35, Barcelona ; Buenos Aires 13, Bilbao.

Directors.—Excmo. Sr. General Don José de Bascaran ; Excmo. Sr. Senatore G. Marconi, G.C.V.O., LL.D., D.Sc. ; Godfrey C. Isaacs ; Excmo. Sr. Don Antonio Comyn, Conde de Albiz ; Excmo. Sr. Don José Sanchez Guerra ; Sr. Don Eduardo Estelat ; Sr. Don Francisco Setuain ; Sr. Don Jaime Macnaughtan and Sr. Don José Asensio.

Secretary.—Sr. Don José Asensio.

Capital.—6,500,000 pesetas, divided into 8,000 6 per cent. Participating Preference shares of 500 pesetas each, and 5,000 Ordinary shares of 500 pesetas each, all issued and fully paid.

The financial year ends on December 31st.

This Company took over the concession from the Spanish Government for the construction and exploitation of a public wireless telegraph service in Spain and its colonies. The Company has ten wireless telegraph land stations erected and working at Aranjuez, near Madrid, Cadiz, Barcelona, Teneriffe, Las Palmas, Vigo, Soller, Finisterre, Santander, and Cape Palos, and has further stations in course of construction. The Company holds an exclusive licence from Marconi's Wireless Telegraph Company, Limited, to use and exploit its patents in Spain and her colonies.

The Company has established a direct wireless telegraph service between Spain and England, and also conducts services with Germany via Aranjuez and Hanover; Austria, via Barcelona and Deutsch-Altenburg; Hungary via Barcelona and Budapest; and Italy via Barcelona and Centocelle (Rome).

Federal Telegraph Company (The)

Incorporated.—In the State of California, in 1911.

Offices.—Hobart Building, San Francisco, California, and 400, Homer Building, Washington, D.C.

Factory.—Palo Alto, California.

Directors.—R. P. Schwerin, Leon Bocqueraz, Hiram W. Johnson, Jun., and Alexander Hamilton.

President.—R. P. Schwerin.

Vice-President.—Leon Bocqueraz.

Secretary.—Augustus Taylor.

Treasurer.—J. E. Godcharles.

Capital.—$100,000 (authorised) in shares of $100 each. All issued to the Poulsen Wireless Corporation, with the exception of the Directors' qualification shares.

The Company was formed for the operation of wireless telegraphy and the manufacture of the Poulsen Arc and other wireless sets.

Marconi International Marine Communication Company, Limited (The)

Incorporated.—April 25th, 1900.

Head Office.—Marconi House, Strand, London, W.C.2.

Directors.—Senatore G. Marconi, G.C.V.O., LL.D., D.Sc.; Godfrey C. Isaacs (Managing Director); Alfonso Marconi; Capt. H. Riall Sankey, C.B., R.E. (retired); Henry W. Allen, F.C.I.S.; W. W. Bradfield, C.B.E.; M. A. Bramston; S. F. St. J. Steadman; Sir Charles J. Stewart, K.B.E.; and Rt. Hon. Lord Herschell, K.C.V.O.

Joint General Managers.—W. W. Bradfield, C.B.E., and Henry W. Allen, F.C.I.S.

Assistant General Manager.—G. E. Turnbull.

Secretary.—H. W. Corby, F.C.I.S

Marine Superintendent.—Capt. C. V. Daly.

Traffic Manager.—W. R. Cross.

Contract Manager.—A. R. Harding.

Technical Adviser.—Captain J. A. Slee, C.B.E., R.N.

Capital.—£1,500,000 in shares of £1 each, issued and fully paid £1,192,506. (The capital was increased in May, 1919, by 600,000 shares of £1 each, which were offered to existing shareholders *pro rata* at par.) 5½ per cent. First Mortgage debentures (bearer)—authorised £250,000, issued £125,000, outstanding £111,340. Secured (without trust deed) as a floating charge on the undertaking and all the property. Reedeemable at par, July 1st, 1941. Interest payable, January 1st and July 1st.

Accounts and Dividends.—Accounts are made up to December 31st and usually submitted in June following. The accounts at December 31st, 1918, showed a profit of £186,341 17s. 1d. for the year, and after payment of dividend, and reserve for repayment of debentures, £141,759 16s. 1d. was carried forward. General Reserve Account, £258,013 13s.

Dividends paid, 1910, 5 per cent.; 1911, 7 per cent.; 1912, 10 per cent.; 1913, 10 per cent.; 1914, 10 per cent.; 1915, 12½ per cent.; 1916, 15 per cent.; 1917, 15 per cent.; 1918, 15 per cent.; 1919 (interim, paid January 15th, 1920), 5 per cent.

Last Bearer Coupon paid, No. 16.

This Company was formed for the purpose of working throughout the world, except in the United States of America, Hawaii, Chili, and colonies or dependencies of those States, an exclusive licence for all maritime (being mercantile or yachting) purposes granted by Marconi's Wireless Telegraph Company, Limited. The Company has transferred to Associated Companies its rights in Canada, Argentina, Uruguay, Australasia, and all European countries and their dependencies except Great Britain and Ireland and Italy. This Company owns and operates the wireless telegraph apparatus on about 3,000 vessels of the mercantile marine.

Marconi Scientific Instrument Company, Limited (The)

Incorporated.—November 1st, 1919.

Registered Office and Works.—21/25, St. Ann's Court, Dean Street, Soho, London, W.C.

Directors.—William W. Drury (Managing), Henry W. Allen, F.C.I.S., W. W. Bradfield, C.B.E., C. Mitchell, Chas. B. Ward.

Secretary.—Chas. B. Ward.

Capital.—Authorised and issued, £12,000 in 12,000 shares of £1 each.

The Company was formed to manufacture and sell amateur telegraphic and telephonic apparatus, to manufacture apparatus under licence from Marconi's Wireless Telegraph Company, Limited, to repair and refashion obsolete apparatus, etc.

Marconi's Wireless Telegraph Company, Limited

Incorporated.—July 20th, 1897, as "Wireless Telegraph and Signal Co., Ltd"; name changed as above in March, 1900.

Head Office.—Marconi House, Strand, London, W.C.2.

Works.—Chelmsford, Essex.

Directors.—Senatore G. Marconi, G.C.V.O., LL.D., D.Sc. (Chairman), Godfrey C. Isaacs (Deputy-Chairman and Managing Director), Captain H. Riall Sankey, C.B., R.E. (retired); Samuel Geoghegan, M.I.Mech.E., M.Inst.C.E.I., Alfonso Marconi, W. W. Bradfield, C.B.E., Henry W. Allen, F.C.I.S., M. A. Bramston, S. F. St. J. Steadman, Sir Charles J. Stewart, K.B.E., Rt. Hon. Lord Herschell, K.C.V.O.

Joint General Managers.—W. W. Bradfield, C.B.E., and Henry W. Allen, F.C.I.S.

Assistant General Manager.—G. E. Turnbull.

Secretary.—H. W. Corby, F.C.I.S.

Chief Engineer.—Andrew Gray, M.I.E.E., A.M.Inst.C.E.

The Company was formed to acquire Senatore Marconi's patents for wireless telegraphy in all countries except Italy, its colonies and dependencies, and has since acquired a large number of other patents relating to wireless telegraphy including those of Sir Oliver Lodge, the General Electric Company of New York (except for America), etc.

It has substantial interests in various subsidiary and affiliated Companies.

The Company conducts public wireless telegraph services and messages are accepted for transmission, via Marconi, to the United States of America, Canada, Australia, New Zealand, the West Indies, British Guiana, British Honduras, Spain, etc.

Accounts and Dividends.—Accounts are made up at December 31st, and usually submitted in June following. The Company's accounts at December 31st, 1918, showed shares at cost in Associated Companies and Patents £1,365,110 (par value £2,345,966) and general reserve account £1,250,000. The profit for the year was £597,938, and after payment of dividends £463,787 was carried forward.

In respect of each of the years 1911, 1912, and 1913 the Company paid dividends of 17 per cent. on the preference shares and 20 per cent. on the ordinary shares; in respect of 1914 and 1915 7 per cent. preference and 10 per cent. ordinary dividends were paid; in respect of 1916 the dividends were 12 per cent. on the preference shares and 15 per cent. on the ordinary shares; in respect of 1917 the dividends were 17 per cent .on preference shares and 20 per cent. on the ordinary shares. For 1918 dividends of 22 per cent. on the preference shares and 25 per cent. on the ordinary shares were paid. Dividends in respect of 1919 of 7 per cent. on the preference shares and 10 per cent (interim) on the ordinary shares numbered 1 to 500,000 and 750,001 to 1,473,648 inclusive were paid on February 2nd, 1920.

(Last Bearer Coupons paid: No. 18 preference, No. 17 ordinary.)

Capital.—Authorised £3,000,000 in 2,750,000 Ordinary shares of £1 each and 250,000 Cumulative Participating Preference shares of £1 each. The Preference shares are entitled to a cumulative dividend of 7 per cent., and, after the Ordinary shares have received a 10 per cent. non-cumulative dividend, to share *pari passu* with the latter shares in surplus profits remaining. Issued, 250,000 Preference shares and 1,223,648 Ordinary shares. In November, 1919, the authorised capital was increased by the creation of 1,500,000 Ordinary shares, which were offered in December, 1919, to existing shareholders pro rata at a premium of £2 per share.

Marconi Wireless Telegraph Company of Canada, Limited (The)

Directors.—J. N. Greenshields, K.C. (President); Senatore G. Marconi, G.C.V.O., LL.D., D.Sc. (Vice-President); Thomas Robb (2nd Vice-President); W. D. Birchall (3rd Vice-President); A. H. Morse, A.M.I.E.E. (London), Mem.Inst.R.E. (New York) (Managing Director); Robert Bickerdike; G. M. Bosworth; Godfrey C. Isaacs; A. E. Francis; C. G. Greenshields.

Manager.—A. L. W. MacCallum.

Treasurer and Acting Secretary.—J. P. Fleming.

Traffic Manager.—G. H. Pearson, Assoc.I.R.E. (New York).

Chief Engineer.—J. O. G. Cann, M.I.(A.)E.E., Mem.Inst.R.E. (New York).

Authorised Capital.—$3,750,000 00 in 1,500,000 shares of $2.50 each.

The Company has the sole rights under all Marconi Patents in the Dominion of Canada and Newfoundland. It is the only Company in Canada manufacturing wireless apparatus and providing wireless service. It owns and operates the wireless equipment of one hundred and seventy-five ships of the Canadian and Newfoundland Mercantile Marines.

On the Great Lakes, the East Coast and in the Gulf of St. Lawrence the Company operates forty wireless stations under agreement with and on behalf of the Canadian and Newfoundland Governments. It owns and operates the duplex Transatlantic commercial wireless telegraph station at Glace Bay, N.S., and has arranged to take over and operate the Transatlantic commercial wireless station at Newcastle, N.B.

The Marconi Wireless Telegraph Company of Canada, Ltd., has divisional offices in Vancouver (B.C.), Toronto (Ont.), Halifax (N.S.), and St. John's (Nfld.). It owns and operates schools of radiotelegraphy in Montreal, Toronto, and St. John's (Nfld.).

Nederlandsche Seintoestellen Fabriek

Incorporated.—February 27th, 1918.

Head Office and Works.—Groest 104/106, Hilversum, Holland.

Directors.—Bern E. Ruys (President), D. Hudig L. Jzn (Commissaire Délégué), A. J. M. Goudriaan, J. H. Hummel, A. E. J. Bertling, H. Van Helden, A. Veder, G. C. Isaacs, G. E. Turnbull, — Ruys.

Capital.—1,000,000 florins, divided into 1,000 shares of 1,000 florins each, of which 750 shares are issued and fully paid.

The financial year ends December 31st.

The Company was formed for the purpose of exploiting a factory or factories for the manufacture of installations, apparatus and tools destined for or relating to wireless telegraphy, telephony, signalling apparatus, etc., and trading in the above-mentioned apparatus. It has entered into an agreement with Marconi's Wireless Telegraph Company, Limited, whereby the latter Company grants to the N.S.F. the exclusive right to manufacture and sell in Holland and the Dutch Colonies wireless material according to its Patents and designs, present and future.

Nederlandsche Telegraaf Maatschappij, Radio-Holland

Incorporated.—December 6th, 1916.

Head Office.—104 Weteringschans, Amsterdam.

Directors.—J. B. A. Jonckheer (President), D. Hudig L. Jzn (Vice-President), J. Rypperda Wierdsma, A. J. M. Goudriaan, J. Wilmink, P. J. Roosegaarde Bisschop, Prof. C. L. van der Bilt, Senatore G. Marconi, Godfrey C. Isaacs, Maurice Travailleur, Gaston Périer, H. Colyn.

Managing Director.—L. H. F. Wackers.

Administrator, Dutch East Indies.—Th. P. van den Bergh.

Capital.—1,000,000 florins, divided into 1,000 shares of 1,000 florins each, all issued and fully paid.

The financial year ends at December 31st.

The Company was formed for the purpose of the establishment, sale, hire, control and exploitation of wireless telegraph and wireless telephone stations on vessels of the mercantile marine of Holland and its colonies.

Norsk Marconikompani Aktieselskap

Constituted.—November 28th, 1918.

Head Office.—Nygaten 2B, Christiania.

Capital.—1,250,000 Kroner, divided into 1,250 registered shares of Kr. 1,000 each.

Directors.—Consul-General O. J. Storm (Chairman), Commander J. Bull, Godfrey C. Isaacs, Maurice Travailleur, H. Westfall Larsen, Otto Thoresen, Colonel R. Rosenqvist.

Deputy-Directors.—Commander B. L. Gottwaldt and E. S. Skottun.

Technical Manager.—Commander B. L. Gottwaldt.

Commercial Managers.—Messrs. Storm and Bull, Ltd., Christiania.

This Company was constituted for the manufacture, sale and, rental of apparatus for Wireless Telegraphy, Telephony, Signalling, etc., and other business in connection therewith. It has acquired the Marconi patent rights, present and future, for use in Norway.

Pan-American Wireless Telegraph and Telephone Company (The)

Incorporated.—State of Delaware, U.S.A. Amended Certificate of Incorporation, October 18th, 1917.

Offices.—233, Broadway, New York City.

Directors.—Hon. John W. Griggs, Edward J. Nally, James R. Sheffield, David Sarnoff, Edward W. Harden, Albert G. Davis, C. B. Coady, R. Mainzer, R. P. Schwerin.

Chairman—Hon. J. W. Griggs.

President and General Manager.—Edward J. Nally.

Vice-President and Commercial Manager.—David Sarnoff.

Secretary.—Charles J. Ross.

Treasurer.—George S. De Sousa.

Capital.—3,500 shares 7 per cent. preferred stock of $100 each, cumulative after January 1st, 1921; 50,000 shares common stock, no par value. The financial year ends December 31st.

The Company has the exclusive right and licence to use the Marconi and Poulsen Patents for the sole purpose of radio or wireless communication between the United States of America and all countries of South America, Central America, Mexico, the Islands of Cuba, Porto Rico, and the West Indies.

Radio Corporation of America (The)

Incorporated.—October 17th, 1919, in the State of Delaware.

New York Office.—Woolworth Building, 233, Broadway, New York City.

Directors.—Owen D. Young (Chairman), E. J. Nally (President), E. W. Rice, Jun., Hon. John W. Griggs (General Counsel), James R. Sheffield, A. G. Davis, Gordon Abbott, Edward W. Harden.

Secretary and Comptroller.—Charles J. Ross.

Treasurer.—George S. de Sousa.

Capital.—Authorised: $25,000,000 Preferred Stock in 5,000,000 shares of $5 each. There are also 5,000,000 Common shares of no par value. Issued: $10,000,000 in 2,000,000 Preferred shares of $5 each, fully paid. 4,000,000 Common shares of no par value. Rights: The Preferred Stock is entitled to receive dividends of 7 per cent. per annum and no more. In any distribution of the assets it is entitled to be paid off at par, prior to any payment to the Common Shareholders. The preferred dividends are cumulative after the fiscal year ending in or with the calendar year 1923 and the Preferred Stock may be retired on any day on which a dividend thereon shall be payable, at $5.50 per share and accrued dividends.

The Company was formed to acquire certain assets of The Marconi Wireless Telegraph Company of America and all wireless inventions, present and future, of the General Electric Company of New York.

Russian Company of Wireless Telegraphs and Telephones (The)

Incorporated.—October 8th, 1908.

Head Office.—14, Lopuchinskaia, Petrograd, Russia.

Directors.—Senatore G. Marconi, G.C.V.O., LL.D., D.Sc.; G. C. Isaacs; S. M. Eisenstein; Pierre de Balinski; M. Salberg; Lt.-Col. Adrian Simpson, C.M.G., R.E. (Managing Director), Admiral I. F. Bostrem, I.R.N. (retired), L.M. Eisenstein (Deputy Director).

Secretary.—Leon Eisenstein.

Capital.—Originally 1,200,000 roubles in 12,000 shares of 100 roubles each. This capital was increased to 1,800,000 roubles in November, 1911, in order to enable the Company to acquire a licence from Marconi's Wireless Telegraph Company, Limited. The capital was further increased in 1913 to 2,400,000 roubles and in 1914 to 3,000,000 roubles, divided into 30,000 shares of 100 roubles each.

The financial year ends December 31st (Russian date).

Dividends.—In respect of the years 1912 and 1913 dividends of 6 per cent. have been paid and 15 per cent. in respect of 1914 and 1915, and 17 per cent. for 1916.

The Company owns the Russian patents taken out in the name of S. M. Eisenstein, and also holds an exclusive licence to use and exploit the Marconi Company's patents in Russia (excluding stations for international communication or on vessels of Russian Mercantile Marine.)

(*N.B.—Owing to the political situation in Russia it has not been possible to revise the particulars concerning the above Company.*)

Société Anonyme Internationale de Telegraphie Sans Fil (La)

Incorporated.—March 31st, 1913.

Head Office.—13, Rue Bréderode, Brussels.

Capital.—4,500,000 francs, divided into 9,000 shares of 500 francs each, all issued ; 4,500 shares are fully paid and the remaining 4,500 shares are 100 francs paid.

The last dividend paid was 12½ per cent. for the year 1918.

The financial year ends at December 31st.

The Company exploits Wireless Telegraphy on vessels of the mercantile marine of all European countries excepting the United Kingdom of Great Britain and Ireland, Germany, Austria-Hungary, Italy and France, and at the present time owns and operates Wireless Telegraph apparatus on nearly 600 vessels.

Société Française Radio-Electrique, Société Anonyme

Incorporated.—April 4th, 1910.

Head Office.—79, Boulevard Haussmann, Paris.

Laboratory.—Suresnes (Seine), 18, Rue de Nanterre et 51, Rue Carnot.

Works.—Levallois-Perret (Seine), 2, Quai Michelet.

Big Machine Works.—Belfort : Société Alsacienne de Constructions Méchaniques.

Tower and Pillar Works.—Venissieux (Rhone), 72, Chemin du Moulin à Vent à Parilly.

Chairman—M. Henri Bousquet.

Vice-Chairman.—M. G. Ferrand.

Financial Directeur.—M. A. Fondère.

Managing Director.—M. E. Girardeau.

Directors.—Comte de Beaumont, Baron de La Chevrelière, P. Desachy, A. Dupont, N. Pietri, O. de Rivaud.

Technical Manager.—Major P. Brenot.

Technical Advisers.—MM. Bethenod, Latour, Boucherot, De Bellescize.

Capital.—7,000,000 francs, divided into 70,000 shares of 100 francs each, all issued and paid up.

The Company manufactures Wireless Telegraph apparatus and engines, and erects Wireless Stations, and also owns and operates the patents of MM. J. Bethenod, E. Girardeau, M. Latour, &c.

It exploits chiefly that system of wireless telegraphy which employs high frequency machines, the system adopted for all the great stations of France and its Colonies and by various other Governments.

The Company also constructs wireless telegraphic and telephonic material for installations on ships and aeroplanes, as well as for military purposes.

During the recent war the Company supplied over 15,000 aeroplane sets to the Allied Armies.

Spanish and General Wireless Trust (The), Limited

Incorporated.—February 16th, 1912.

Head Office.—Marconi House, Strand, London, W.C.2.

Directors.—Godfrey C. Isaacs (Chairman and Managing Director), Alfonso Marconi, Captain H. Riall Sankey, C.B., R.E. (retired), S. St. J. Steadman.

Secretary.—H. W. Corby, F.C.I.S.

Capital.—Authorised, £350,000 in 350,000 shares of £1 each. Issued, 249,007 shares of £1 each. The object of the Company is to hold shares in the subsidiary Marconi Companies, in particular those of the Compañía Nacioñal de Telegrafía sin Hilos, the denomination of whose shares renders them difficult to negotiate on the London Stock Exchange. The Company holds at present 12,350 Bearer shares of 500 pesetas each in La Compañía Nacioñal de Telegrafía sin Hilos.

At June 30th, 1919, the profit and loss account showed a credit balance of £5,982 17s. 9d.

Wireless Press Incorporated (The)

Head Office.—25, Elm Street, New York City, N.Y.

Directors and Officers.—Edward J. Nally (President), Charles J. Ross (Vice-President), Geo. S. De Sousa (Treasurer), David Sarnoff (Secretary), Roy A. Weagant, and W. A. Winterbottom.

Manager.—J. D. Conmee.

Editor.—J. Andrew White.

Publishers of the "Wireless Age" and "Ocean Wireless News" and a large number of technical books on Wireless, etc.

Wireless Press (The), Limited (Private Company)

Incorporated.—October 7th, 1910.

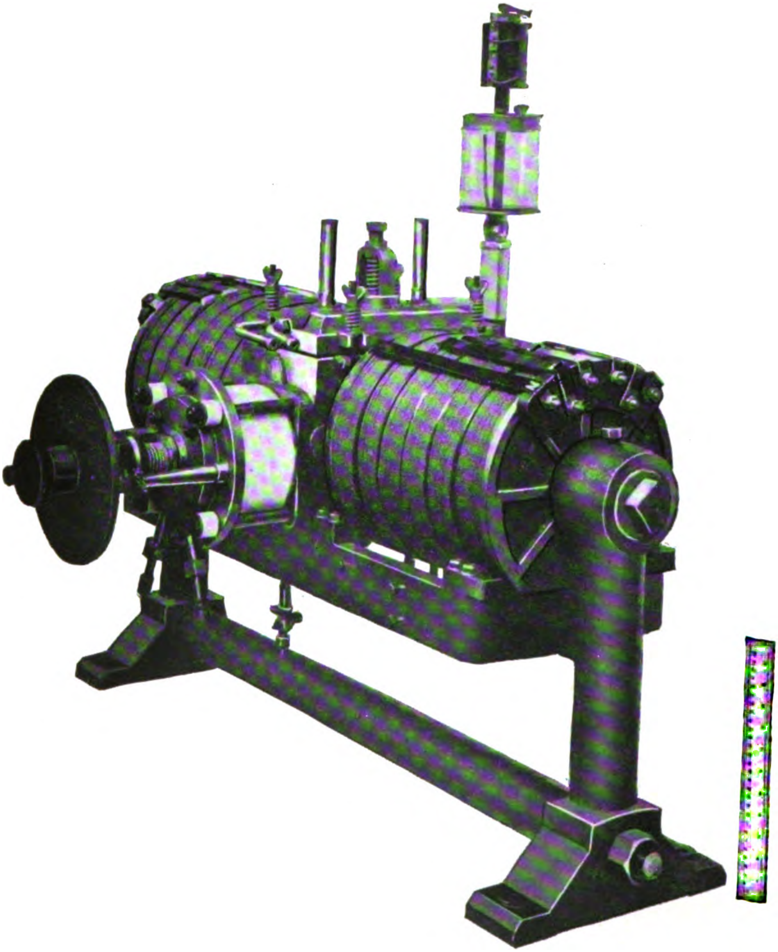
Head Office.—12/13, Henrietta Street, Strand, London, W.C.2.

Directors.—Godfrey C. Isaacs, Captain H. Riall Sankey, C.B., R.E. (retired), C. B. Clay, W. W. Bradfield, C.B.E., Captain C. V. Daly, J. St. Vincent Pletts, and Henry W. Allen, F.C.I.S. (Manager).

Secretary and Assistant Manager.—A. H. Brewster.

Capital.—Authorised, £50,000 in 50,000 shares of £1 each. Issued and fully paid, £29,477 in 29,477 shares of £1 each.

The Company publishes Technical and Scientific Books and Periodicals, including THE YEAR-BOOK OF WIRELESS TELEGRAPHY AND TELEPHONY (annually), the "Radio Review" (monthly), "Conquest" (monthly), and the "Wireless World" (fortnightly).



25 K.W. ARC SET.

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BIOGRAPHICAL
S E C T I O N

(A) Biographies.

(B) Obituary Notices.

BIOGRAPHICAL NOTICES

A

Abraham, Henri.—General Secretary of the Société Française de Physique, 1901 to 1913, now Professor of Physics at the Sorbonne in Paris.

Albiz, Count, Managing Director, Compañía Nacional de Telegrafía sin Hilos, December 24th, 1910. B. Madrid 1858, Scotch origin. His father was sometime Spanish Ambassador in London. Educ. Madrid University, London University College and Australia. Diplomat, Member of Parliament, and of Spanish House of Lords (Tory). Sub-secretary of the Prime Minister's Office. Counsellor of the British Embassy in Madrid, and of the London County Westminster and Parr's Bank, Limited.

Alexander, Joshua Willis.—Secretary of Commerce in the Cabinet of President Woodrow Wilson. B. Cincinnati, Ohio, January 22nd, 1852. Attended the public schools of Cincinnati for three years, when he and his mother moved to Canton, Lewis County, Mo. There he finished the public schools and entered Christian University, 1868, graduating therefrom, 1872, with the degree of A.B. Same institution conferred upon him the honorary degree of A.M., 1907. Moved to Gallatin, Mo., June, 1873, and has resided there ever since. Married the daughter of the late Judge Samuel A. Richardson in February, 1876. Studied law and was admitted to the bar, 1875. Elected public administrator, 1876, and re-elected, 1880. Served 21 years on the Board of Education, Gallatin school district, and two terms as mayor of Gallatin. Elected to the General Assembly of Missouri, 1882, and re-elected, 1884. Chairman of the committee on appropriations. Elected again 1886 and served as speaker of the house. Judge of the seventh judicial circuit of Missouri, January, 1901, until February, 1907. Re-elected for a six-year term, 1904, and resigned to take his seat in the Sixtieth Congress. Named by President Wilson as House of Representatives member of the United States Commission to the International Conference on Safety of Life at Sea, London, 1914, and selected by the commission to be chairman thereof. Elected to the Sixtieth, Sixty-first, Sixty-second, Sixty-third, Sixty-fourth, Sixty-fifth and Sixty-sixth Congresses. Resigned as Member of Congress, December 15th, 1919.

Alexanderson, Ernst Fredrik Werner.—Chief Engineer, Radio Corporation of America. B. Upsala, Sweden, January 25th, 1878. Educ. at the High School and University of Lund, Sweden, and at the Royal Institute of Technology, Stockholm, completing a post-graduate course at Berlin. Entered the service of the C. and O. Electric Company, 1901. Joined the General Electric Company, 1902. Occupies the post of consulting engineer to the latter concern. Introduced iron into the manufacture of high frequency circuits, and originated the development of larger alternators and the magnetic amplifier. He came into contact with Mr. Marconi during the visit of the latter to Schenectady in May, 1915, and the large radio frequency alternator and magnetic amplifier for radiotelegraphic work designed by Mr. Alexanderson was installed in the Marconi Company's station at New Brunswick, N.J., and has now been adopted by that company and the Radio Corporation of America. Holds a number of United States patents. Member of the American Institute of Electrical Engineers. Fellow of the Institute of Radio Engineers. Author of a number of papers read before various technical societies. Address: 8, Adams Road, Schenectady, New York.

Allen, Henry W., F.C.I.S. (1902), Joint General Manager, Marconi's Wireless Telegraph Company, Ltd., and Marconi International Intercommunication Company, Ltd.

(1919). B. 1870. Educ. Wilton; Pitman's School, London. Commenced commercial life in the Metropolis 1891. Met Senatore Marconi in 1896. Assisted in 1897 in formation of the Wireless Telegraph and Signal Co., Ltd., afterwards becoming secretary to the company. Secretary of Marconi International Marine Communication Co., Ltd., and Assistant Manager of Marconi's Wireless Telegraph Co., Ltd. (1900). Deputy Manager Marconi's Wireless Telegraph Co., Ltd. (1910). Visited the United States and Canada (1911 and 1913) in connection with affairs of these companies. Elected to a seat on the Board of each company in 1917.

Appleton, Edward Victor, M.A. (Cantab.), B.Sc. (Lond.), Fellow of St. John's College, Cambridge. B. Bradford, 1892. Educ. St. John's College, Cambridge. First Class Honours in National Science Tripos Parts I. and II. (Physics). Served European War 1914–1919 as Captain W/T, R.E. Specially interested in Thermionic Valves. Engaged in Valve research Cavendish Laboratory, Cambridge.

Arco, Graf Georg von.—B. Grossgorschütz, Germany. Educ. at Berlin University and Technical High School, Charlottenburg. Assistant to the late Professor Slaby in the department of wireless telegraphy, 1898; later joined the Allgemeine Elektrizitäts Gesellschaft, Berlin, continuing at the same time his work on the Slaby-Arco system of wireless telegraphy. Manager of the Gesellschaft für Drahtlose Telegraphie, 1903. Carried out practical wireless telephony over a distance of 35 km. (21·7 miles), 1906. Exhibited high-frequency apparatus at the International Radiotelegraph Congress in London, 1912. Address: Jempelhof, Berlin, Albrechtstrasse 49/50.

Armstrong, Edwin H., Professor at Columbia University and President of the Radio Club of America. B. in U.S.A. December 18th, 1890. Graduated at Columbia University in 1913. Has undertaken radio-telegraphic work in conjunction with Professor Pupin at the Columbia Laboratories. He is himself a director of the Institute of Radio Engineers, and was recently awarded the medal of the Institute. Served two years in A.E.F. as Captain and Major in the Signal Corps. Decoration: Chevalier Légion d'Honneur. Present address: Columbia University, New York City.

Asano, Dr. Osuke.—B. 1859. Graduated at the Engineering College of the Tokyo Imperial University, 1881. Honorary Professor, Tokyo University. Director of the Electro-Technical Laboratory of the Department of Communications, 1897. Retired, 1919. Took many trips to Europe and America, first for the investigation of electrical engineering; second as a Japanese delegate of the International Wireless Telegraph Conference, Berlin, 1906; and third as a Japanese delegate of the International Conference on Electrical Units and Standards, London, 1908. Pioneer of wireless investigation in Japan, and his investigation has continued since 1897. The so-called "Teishinsho" wireless system is due to his investigations. Laid the submarine cable between Formosa and Osumi in 1895-7, the first long-distance submarine cable ever laid by a Japanese at that time. Raised to the rank of Dr. Engineer, 1899. Supervises all electrical works in Japan. Awarded 2nd Order of Merit, 1914.

Asin, Don Humberto de, Engineer-in-Chief of the Radiotelegraph Service of Bolivia. Studied electricity at the University of Santiago. Chief of important technical sections, railways of Guaqui y Arica at La Paz. Studied radiotelegraphy. Visited San Cristobal, Lima, the School of Santiago, and the two installations which were then at the Docks, Buenos Aires. Commissioned by Bolivian Government to visit Europe. Graduate as radiotelegraphist at the Marconi Company's professional school at Broomfield. Visited Germany to study the Telefunken system. Installed six stations in Bolivia and will instal Trinidad, Cobija, Villa Bella, Concepción, Magdalena, San Ignacio, Puerto Suárez, Santa Cruz, Todos Santos and many more.

Athanasiadis, Capt. C.—B. Athens, 1878. Educ. Royal Naval College, 1892. Commissioned in the Navy, 1896, and after eleven years' active

service became interested in wireless telegraphy. Supervised the erection of the first wireless installations in Greece. Sent to London, 1909, by his Government as the head of a mission for the construction of Greek wireless stations. Remained in England for a year and a half, and during that period came into close contact with the Marconi organisation. On his return to Greece he was appointed head of the Radio Telegraph Service of the Navy, a position which he still holds. Author of the standard Greek instructional books in wireless, and has achieved some successes in the realms of poetry and the drama.

Atterberg, G. H.—B. 1886. Supt. Wireless Station, Haernoesand, Sweden. Address: Hultom, Sweden.

Austin, Louis Winslow, Ph.D.—Head of the U.S. Naval Radiotelegraphic Laboratory, Washington, D.C., since 1908. Son of Professor L. A. Austin, of Middlebury College. Educ. Middlebury College, Clark University, and the Universities of Strassburg and Berlin. Assistant professor of physics at the University of Wisconsin, then joined the staff of the Physikalisch-Technische Reichsanstalt, Berlin. Dr. Austin is especially interested in quantitative high-frequency measurements. Delegate to the London International Radiotelegraphic Conference. President of the Institute of Radio Engineers, 1914. Address: Radio Building, Bureau of Standards, Washington, D.C.

B

Baker, T. Thorne.—B. March 19th, 1881. Educ. Mercers' School, London, and passed Intermediate Science examination at the University of London. After five years' work as research chemist visited Paris, 1907, to take up Prof. Korn's system of photo-telegraphy, and superintended the operation of the system between Manchester, Paris, and London. This was eventually superseded by a new system of his own invention. Since devoted his time to high-frequency and X-ray research work.

Ballantyne, Hon. Charles Colquhoun.—Minister of Marine and Fisheries, and Minister of the Naval Service of Canada. B. August 9th, 1867, Dundas County, Ontario. Educ. local Public School and Commercial College, Montreal. He has been connected with the Militia for many years, and raised a battalion of the Grenadier Guards of Canada for overseas service, 1916. Member of the Montreal Harbour Commissioners. Privy Councillor, October 3rd, 1917. Minister of Public Works. Resigned that portfolio. Minister of Marine and Fisheries and Minister of the Naval Service, October 13th, 1917. Elected to the House of Commons for the St. Lawrence-St. George Division of Montreal, 1917. Independent in politics. Member of the Presbyterian Church. Member of the Mount Royal, St. James, Canada, Forest and Stream, Jockey and Hunt Clubs, Montreal, and of the Rideau Club, Ottawa. Addresses: Ottawa and Montreal.

Bangay, Raymond D.—B. Lyme Regis, 1883. Educ. Epsom College and Finsbury Technical College. Joined the Marconi Company, 1902. Spent five years in America, during which time was engaged in different branches of the Service. Returned to England and studied Military Wireless Stations. Chief of the Field Station Department, Marconi's Wireless Telegraph Co., Ltd., 1914. Author of "The Elementary Principles of Wireless Telegraphy," and "The Oscillation Valve." Address: Gresham Cottage, Brentwood, Essex.

Bascaran, General J. de, President of the Compañía Nacional de Telegrafía sin Hilos, March, 1913. B. 1843. Served on the General Staff as Adjutant of King Alfonso XIII. Chief of Military Cabinet. Military Governor of Madrid. Possesses 15 great crosses (Victoria, of Great Britain; Légion d'Honneur, of France; San Benito de Avis and Concepción de Villaviciosa of Portugal; Carlos III.; Isabel la Católica; Mérito Militar; Mérito Naval of Spain, etc.

Beggerow, Dr. Hans.—Admiralty-Counsellor since June, 1914. B. September 30th, 1874. Educ. University of Berlin, and Freiburg-in-Breisgau, where he obtained his Doctorate. Since 1901, expert adviser to the German Admiralty in all matters

concerning wireless telegraphy. Similar position in the Prussian Army, 1906/14. Address: Berlin, D.15, Meierottostr. 3.

Bellini, Dr. Ettore.—B. Foligno, Italy, April 13th, 1876. Educ. Naples University. Electrical Engineer to the Royal Italian Navy, 1901. Chief of the Naval Electrical Laboratory at Venice, 1906. Responsible for carrying out research work dealing with the employment of wireless telegraphy on warships and submarines. Joint Inventor with Capt. Tosi, of the Radiogoniometer, an apparatus for directive wireless telegraphy.

Bethenod, J. F. J.—Consulting Engineer to the French Société Radio-Electrique. B. Lyons, 1883. Educ. Central School of that city. For a number of years acted as the Assistant of Professor André Blondel. From 1903 onward, published a large number of theoretical articles on Electro-Dynamic Machinery, and has entered into business relationship with a number of Constructional Engineering Houses for the exploitation of his inventions. After a term of military service in the Engineers, specialised in wireless telegraphy. In this field, both scientific investigation and industrial practice owe several important contributions to his activities. A number of wireless stations of varying power have been installed, wherein his devices are utilised. Of recent years, M. Bethenod has turned his attention to high frequency alternators, and has built machines giving remarkable results.

Bhering, Francisco, Professor of Geodesy and Astronomy in the Polytechnic School of Rio de Janeiro, Director of the Technical Branch of the Telegraphic Administration. B. Uberaba, state of Minas Geraes, Brazil, January 1st, 1867. Under his initiation and supervision survey and mapping of Brazil undertaken in unified maps on the scale of one millimetre per kilometre. Represented Brazil as delegate at the International Telegraphic Conference of 1903, at the Radiotelegraphic Conference, London, in 1912, and at the Time Conference, 1912. Member of the mixed Civil and Military Commission organised to deal with wireless matters. Author of a number of works on civil engineering, geography, and telegraphy. Address: Rua Conde Irajá No. 111, Rio de Janeiro, Brazil.

Bjarnov, Alexander William.—Telegraph engineer, cand.-polyt.; Eng.-in-Chief of the Danish Telegraph Dept.'s Third Engineering District; Fellow of Danish Engineers' Ass. and of the Electrotechnic Association (Elektroteknisk Forening); member of the Board from 1911 to 1919; Associate of the American Scandinavian Foundation. B. Copenhagen, 1874. Studied Polytechnic Academy, Copenhagen. Attached to the Telegraph Dept. since 1903. Passed through the Naval and Torpedo Department Spark Telegraph School for Officers in 1907. Since 1909, together with Helmuth Schledermann, has supervised the examination of wireless operators and the inspection of wireless stations on board ships flying the Danish flag. Address: Gl. Kongevej 96, Copenhagen V.

Bjoerkman, S. O. V.—B. 1883. Since 1911 Superintendent of the Wireless Station at Nya Varvet, near Gothenburg, Sweden. Address: Nordhemsgatan 33, Gothenburg.

Blandy, Col. Lyster Fettiplace, D.S.O., Controller of Communications at the Air Ministry. Officer of the Legion of Honour, Holder of the Order of the Crown of Belgium, the Croix de Guerre, Mons Star, General Service and Victory Medals. B. September 21st, 1874. Educ. Haileybury College and Royal Military Academy, Woolwich. Entered Royal Engineers March, 1895. Captain 1904, Major 1914. From 1908-12 Inspector Royal Engineers Stores at Woolwich during which period he had much to do with Army Field Wireless Sets. In the start of 1913 commanded small unit of 30-40 men, the Wireless Signal Company, destined to be the nucleus at G.H.O. of the Wireless personnel in the British Army. From 1914-1917 in charge of Wireless Communication of the B.E.F. in France. Became Chief Experimental Officer of Army Signals Experimental Establishment, July, 1917. Chief Ex-

perimental Officer R.A.F., April, 1918, and thence transferred to present post. Address: Naval and Military Club.

Blondel, André E.—B. Chaumont, France, 1863. Graduated at Paris University. Contributor to learned societies and technical journals on several subjects, including wireless telegraphy. Invented (1893) a new apparatus, which is known as the "Oscillograph," and which opened a fresh field for the study of alternate currents. Was the first to explain, mathematically (1893), the effect of inertia in the hunting of alternators. Among his other activities in wireless telegraph, mention should be made of directed waves produced by a double aerial oscillating on the fifth harmonic, and also of a system of acoustically syntonic wireless telegraphy.

Blondlot, Professor Prosper René.—B. Nancy, 1849. After completing his scientific studies in Paris, returned to Nancy. Became Professor at the Faculty of Sciences. Now Hon. Professor and Correspondent of the Institute of France. Devoted considerable study to the problem of electromagnetic waves, the main object of his researches being to determine the speed of propagation of such waves. In 1891 he found for this speed the value 302,200 km. per second, and, in 1893, by another and quite different method, the value 297,200 km. per second. Has also investigated the laws of propagation of wireless waves in various media.

Bradfield, William Walter, C.B.E.—Joint General Manager, Marconi's Wireless Telegraph Company, Ltd., and Marconi International Intercommunication Company, Ltd. B. London, 1879. Entered the Wireless Telegraph and Signal Co., Ltd., 1897. Electrical assistant to Senatore Marconi all through the course of the latter's experimental work in Radiotelegraphy on Salisbury Plain, during 1897. Installed the first wireless apparatus on British battleships, 1899, and a little later assisted in demonstrations to the United States Government on board the United States battleship "Massachusetts." In 1901 similar demonstrations conducted by him for the French Government resulted in the establishment of wireless communication between the French Riviera and Corsica. Supervised in 1901 the erection of the well-known station at Siasconset and the Nantucket Lightship. Chief Engineer to the Marconi Wireless Telegraph Co. of America, 1902. Deputy Manager of the Marconi's Wireless Telegraph Company, and of the Marconi International Marine Communication Co., Ltd. Manager of both concerns, 1910. Elected to the Board of the two companies, 1917. Address: 1, St. James's Place, London, S.W.

Branly, Edouard.—B. Amiens, October 23rd, 1844. Educ. St. Quentin College and Henry IV. College, Paris. Fellow of the University, Doctor of Physical Science, and Doctor of Medicine. Some of his works relate to the electrical conductivity of radio-conductors. International Jury of Superior Precept Instruction awarded him (1900) *grand prix* for his exhibition of radio-conductors. French Minister of Public Instruction made him a Chevalier of the Legion of Honour in recognition of the part he had played in connection with the discovery of "Wireless Telegraphy" Has constructed various independent distributing apparatus for producing tele-mechanical effects without wires. Elected a member of the Academy of Science, Paris, January, 1911.

Brenot, Commandant Paul.—B. Ruoms, Ardèche, September 19th, 1880. Educ. Ecole Polytechnique. Transferred to the Central Establishment of Radiotelegraphy, and supervised the installation of wireless at most of the military stations, both permanent and mobile. Represented wireless telegraphy at the International Electrical Congress at Marseilles, 1908, and later on collaborated with M. Blondel in various investigations into the employment of frame aerials for radiogoniometry and high tension arcs for wireless telegraphy and telephony. Carried through some important experiments on the employment of wireless telegraphy in aircraft, 1910-11, which gained for their originator the Cross of the Legion of Honour. Before the war, head of the practical work in the

advanced wireless school. Technical adviser to the Minister of the Colonies, 1911, and took over the organisation of the Colonial systems, particularly those applying to communication between the various Colonial units. Delegate of the Colonial Office at the International Radiotelegraphic Conference, London, 1912; at the International Time Conference, Paris, 1912-1913, and at the International Safety-at-Sea Conference, London, 1913-1914. During the war, whilst remaining in charge of French Colonial wireless, appointed head of the Radiotelegraphic Centre at Paris and of the Eiffel Tower Station. Left Army, 1919. Became Technical Manager of the Société Française Radio-Electrique and Consulting Engineer to the Compagnie Générale de Télégraphie sans Fil.

Bright, Sir Charles, F.R.S.E., M.Inst. C.E., M.I.Mech.E., M.I.E.E.—Consulting Engineer and Electrician to the Commonwealth of Australia. B. London, 1863. Educ. Lancing College and King's College. Articled to his father, 1881. Since that date he has been engaged, both as engineer and electrician, in the construction, testing, laying, and repairing of some 25,000 miles of submarine cable. Represented Australia as sole delegate at the International Radiotelegraphic Conference, 1912. Vice-President of the Wireless Society of London.

Brown, Frank James, B. 1865 near York. Educ. privately. Graduated M.A., B.Sc., at London University (Honours and Prizeman). Entered the Higher Division of the Civil Service, 1886. Appointed to the Post Office. Principal Clerk 1910. Assistant Secretary in charge of Telegraphs, March, 1919. Member of British Peace Delegation, 1919, in capacity of expert adviser on telegraph questions. Post Office representative on Imperial Communications Committee, and Member of Wireless Telegraph Sub-Committee of that Committee. Member of Imperial Wireless Telegraphy Committee appointed by Government in 1919 to formulate a scheme of W/T for the Empire. Address: G.P.O., London.

Brown, Sidney George, M.I.E.E.—B. 1873, Chicago, U.S.A., of English parents, and brought to England when 18 months old. Educ. Harrogate and London University. Made a special study of submarine telegraphy and is inventor of the magnifying cable relay. Invented the drum cable relay and the magnetic shunt, 1898. Since that date he has also devoted much attention to telephony and wireless telegraphy and has achieved some important results, such as the carbon telephone relay, telephone transmission on land trunk lines, the improved wireless telephone receiver, and other inventions. Vice-President of the Wireless Society of London.

Bucher, Elmer E.—B. Akron, Ohio, November 11th, 1885. Educ. Academy Oberlin, Ohio. Joined the De Forest Wireless Telegraph Company as experimental engineer, 1903. Constructed several high-power stations in the Middle West and on the Gulf Coast for this firm. Joined the United Wireless Telegraph Company as installation and experimental engineer, 1907. Installed the first ship stations of the United States Navy. Organised the United Wireless Telegraph Company's School, 1909. Instructing engineer and chief inspector of that company for more than two years. Associated himself with the Y.M.C.A., New York, in the initiation of wireless schools, 1910. Joined the Marconi Wireless Telegraph Company of America as instructing engineer, 1912, which position he still holds. Devoted many years to experimental long-distance wireless work and holds a large number of U.S. wireless patents. Technical editor of the "Wireless Age," 1913, and assisted in the organisation of the National Amateur Wireless Association of America. Author of "Practical Wireless Telegraphy" and other works. Member of the Institute of Radio Engineers.

Bullard, Rear-Admiral W. H. G., U.S.N.—B. December 6th, 1866, State of Pennsylvania, U.S.A. Graduated at the United States Naval Academy, 1886. Served on ships of the Navy on the Atlantic, South Atlantic, Pacific, and Asiatic Stations, with shore duty, with particular reference to the science of Electrical Engineering, in which he had specialised.

First Superintendent of the Naval Radio Service, 1912-16. Under his supervision the communication system of the Navy Department was developed and enlarged. Delegate-plenipotentiary of the United States at the International Conference for Safety of Life at Sea, London, November, 1913. In charge, on behalf of the United States Navy, of the wireless operations contained in the series of experiments carried out between the Eiffel Tower and Arlington to determine longitude by means of wireless telegraphy.

Burstyn, Dr. W.—B. Austria, 1877. Educ. Vienna University. He started his career as an electrical engineer with the Siemens-Schuckert Werke at Charlottenburg. Was later engineer with the Gesellschaft für Drahtlose Telegraphie. Developed together with Baron Lepel (1907–1912) the quenched spark system. Address: Berlin—Wilmersdorf, Prinzegentenstrasse 23.

C

Chaffee, Professor E. L., Assistant Professor of Physics, Harvard University.—B. April 15th, 1885, Somerville, Mass. Educ. High School, Somerville, and Massachusetts Institute of Technology in Boston. Graduated B.S. in Electrical Engineering, 1907. Awarded the degree of M.A. in Physics, Harvard University, 1908, and Ph.D., 1911. Conducted courses in physics and radiotelegraphy at Harvard University. Engaged in research and consultation work in radiotelegraphy. Author of several papers, including "A New Method of Impact Excitation of Electric Oscillations and their Analysis by the Braun Tube Oscillograph," published 1911. During the war engaged in developing some radio apparatus, with which he experimented in France, 1918.

Chamberlain, Eugene Tyler.—Son of General Frank Chamberlain. B. in Albany, N.Y., September 28th, 1856. Educ. Albany Academy and Harvard College. Graduated with honours in Metaphysics, 1878. In business for two years, then took up journalism and acted as legislative and political correspondent to the Associated Press. Came to Washington, 1893. Appointed Commissioner of Navigation by President Cleveland. In 1903, on the creation of the Department of Commerce and Labour, he joined others in urging the importance of wireless telegraphy as a means of promoting safety of life on merchant vessels at sea, and he has since played a prominent part in promoting legislation on this subject. Delegate for the U.S.A. to the Convention on Safety of Life at Sea, at London, 1914. Address: Commerce Department, Navigation Bureau, Washington, D.C

Chevrelière, Jean Marie Charles Aymé, Baron de la.—B. Poitiers, France, 1858. Educ. in that city. Member of Parliament, Mayor and General Counsellor. After a course at the Military Academy of St. Cyr (1877-1879), followed by specialised training at Saumur, remained for fifteen years in the active army as cavalry officer, retiring with the grade of captain in the Reserve, 1892. Member of Légion d'Honneur, Military class. Mobilised from August 2nd, 1914, to July 5th, 1917. Joined the Board of the Belgian "Société Anonyme de T.S.F.," 1901, and subsequently took a prominent part in the initiation of the "Compagnie Française Maritime et Coloniale de T.S.F.," now known as "Compagnie Industrielle de Mécanique et d'Electricité," of which he is President and Managing Director. From early 1914 to the end of January, 1918, occupied the post of managing director of the Cie. Universelle de T.S.F., which on February 12th of the same year was merged in the Cie. Générale de T.S.F., of which he is vice-president. Also Director of "Société Française Radioélectrique" and "Compagnie d'Exploitation Radioélectrique." Address: 23, rue Dumont d'Urville, Paris.

Childs, H. B. T.—Chief of Aircraft Dept. Marconi's Wireless Telegraph Co., Ltd. B. Llandilo, S. Wales, 1884. Educ. King's School, Canterbury; London University. Joined the Marconi Company 1905. Served as Engineer in Russia, Canada, Spain and Egypt. Joined Royal Flying Corps autumn 1915. Served in France, November, 1915, to August, 1917. Appointed to command W/T

Experimental Establishment, R.A.F., August, 1917. Promoted Lieut.-Col. December 1917. Appointed in charge of W/T for the R.A.F. in France May, 1918, till April, 1919.

Chow, Kia Ni.—Director-General of the Chinese Telegraph Administration. Is a native of the Paoshan District in Kiangsu Province. Graduated at the Kiangnan Arsenal Imperial College in Shanghai, and qualified by examination (1888) as telegraph engineer at the Imperial Telegraph College, Tientsin. In charge of the construction of the telegraph lines in Kansu and Sinkiang Provinces, 1888-1901. Controller of the Tientsin Telegraph Office, 1901-11. Chief Superintendent of the head office of the Imperial Chinese Telegraph Administration, Shanghai, 1911. Chief of the Sub-Departments of Maintenance, Traffic, and Engineering, Telegraph Department of the Ministry of Communications, Peking, 1912-17. Commissioner of the Telegraph Department and Director-General of Telegraphs of the Ministry of Communications, 1917. Chairman of the Chinese Society of Electrical Science. Director of the China Electric Company, Ltd.

Chree, Charles.—Superintendent of Kew Observatory since 1893. B. 1860, Lintrathen, Forfarshire. Sc.D. of Cambridge, Hon. LL.D. (Aberdeen), F.R.S. Graduated M.A. Aberdeen (1879) with first-class honours in Mathematics and Natural Philosophy. At Cambridge, in 1883, was sixth wrangler, gaining also 1st class honours in Mathematical and Natural Sciences Triposes. Fellow of King's College, Cambridge (1885); re-elected Research Fellow (1891). Ex-President of Physical Society of London; member of the British Association Committee for Radiotelegraphic Investigation. Holds Watt Medal of Institution of Civil Engineers. Largely concerned with geophysics, especially terrestrial magnetism and atmospheric electricity. For his researches in the former subject received Hughes Medal from the Royal Society. Publications: "Studies in Terrestrial Magnetism," articles in "Encyclopædia Britannica." Address: 75, Church Road, Richmond, Surrey.

Cohen, Louis, Ph.D., Consulting Engineer.—B. 1876. Educ. at Armour Institute of Technology, University of Chicago and Columbia University. On scientific staff of the Bureau of Standards, 1905-1909. Chief of Research Department of the National Electric Signalling Co., 1910-12. Engaged in consulting practice since 1912. Professor of Electrical Engineering, George Washington University. Especially interested in the subject of electrical oscillations. Author of "Formulae and Tables for the Calculation of Alternating Current Problems," and scientific and technical papers dealing with problems in wireless telegraphy and kindred subjects.

Collette, August Everhard Rudolf. B. June 25th, 1857, at Maastricht; studied for the profession of civil engineer at the Polytechnic School at Delft. Joined the staff of the Netherlands State Telegraphs, 1880; Governmental Telegraph Engineer for special service, 1893; Engineer-in-Chief of the Netherlands Telegraphs and Telephones; General Manager of the Technical Service. Has given special attention to wireless telegraphy from its initiation. Member of the Permanent Commission for Wireless Telegraphs. Address: Heemskerckstraat, 30, The Hague, Holland.

Coursey, Philip R., B.Sc. (Eng.), A.M.I.E.E., F.P.S.L.—Sub-editor "The Radio Review." B. 1892. Educ. University College, London. Awarded Diploma in Electrical Engineering with Distinction. Graduated with first-class Honours in Electrical Engineering at the University of London. Subsequently acted as Assistant to Dr. J. A. Fleming, F.R.S., in the Electrical Engineering Department, and Research Laboratories of University College, London. From 1915–1918 served as Inspector of Wireless Telegraph Apparatus for the Admiralty; afterwards appointed to the Staff of H.M. Signal School, Portsmouth, as Research Physicist. Some time Research Electrical Engineer to the Dubilier Condenser Co. Author of papers on Radio-telegraphy and Telephony read before a number of Societies.

Crawley, Lieut.-Col. C. G., Royal

Marine Artillery (ret.), M.I.E.E., Deputy Inspector of Wireless Telegraphy, General Post Office. Employed at Wireless Telegraphy in the Navy, 1903 to 1913, as Experimental Instructional, and Fleet Wireless Officer. Deputy Inspector of Wireless Telegraphy in the Post Office, 1913. Returned to the Naval Wireless service (1914) for the period of the war. During the war served in the Grand Fleet, in command of the R.N.V.R. Wireless School, at the Admiralty, and supervised the erection and working of various Naval stations abroad. Received letters of appreciation of services from the Admiralty. Officer of the Order of Aviz. Resumed his duties in the Post Office, 1919. Address: General Post Office, London, E.C.

Cresswell, F. G., A.M.I.E.E.—Radio Commander in the Australian Navy. Entered upon professional career, 1897, and received his training and experience with engineering firms in Australia. Entered Government service in the Electrical Engineer's Branch of the Postmaster-General's Department, Melbourne. Commissioned in the Naval Forces of the Commonwealth as Engineer Sub-Lieutenant detailed for electrical duties, 1907. Served in the Royal Australian Navy from the time of its inauguration. Appointed Fleet Wireless Telegraph Officer, 1912, rising to the rank of Radio Commander and Acting Director of the Radio Service, July, 1916. On his return from naval operations in the Pacific during the early stages of the late war, was selected to take over the control, under the Naval Board, of the Wireless Telegraphy Department of the Commonwealth, which had been transferred by Act of Parliament to the control of the Royal Australian Navy. His first work was that of organising the Commonwealth Radio Service on naval lines and under naval discipline. Assisted at the capture of the German high-power wireless stations at Samoa, Nauvu and Rabaul, being mentioned in despatches for distinguished service. Member of the Institute of Electrical Engineers (Australia). Address: Naval Radio Service, Collins House, Melbourne.

Cross, Professor Charles R.—B. at Troy, New York, March 29th, 1848. Returned with his father to Newbray Port, Massachusetts, 1862. Graduated at the Putnam Free School in that city, 1865, and engaged temporarily in teaching. Graduated at Massachusetts Institute of Technology, 1870. Appointed instructor in Physics. Became a Junior Professor in Physics, 1875. Placed in charge of the Dept. of Physics, 1877, and later Thayer Professor of Physics and Director of the Rogen Laboratory of Physics. Became interested in the industrial applications of electricity. Lectured upon this subject, 1881. Retired from active teaching 1918 and made Professor Emeritus. Author of papers embodying the results of researches upon electric and acoustic subjects. Has delivered many public lectures, a number of which were before the Lowell Institute of Boston. Acted as expert for the American Bell Telephone Company throughout the extended litigation concerning the Bell patents, as well as in other telephone cases. Expert for the American Marconi Company in the suits which resulted in the establishment of its fundamental patents. Fellow of the American Academy of Arts and Sciences. Chairman of the Rumford Committee of that institution for twenty-two years. President of the Elizabeth Thompson Science Fund, a member of the American Association for the Advancement of Science, the British Association for the Advancement of Science, and of the American Institute of Electrical Engineers, of which he was one of the original vice-presidents. Past Chairman of one of the three Lectures of the Electrical Congress at the World's Columbian Exhibition at Chicago, 1893.

D

De Forest, Dr. Lee.—B. Council Bluffs, Iowa, August 26th, 1873. Graduated Ph.D. 1899. Founded the De Forest Wireless Telegraph Co. 1902, the Radio Telephone Co. and the De Forest Radio Telephone Co., 1907. Awarded gold medal for radio-telegraphic work, St. Louis Exhibition, 1904. He distinguished himself

in the American-Spanish War, 1898. Member of the Institute of Electrical Engineers, of the Franklin Institute, and of the Institute of Radio Engineers. President of the Wireless Association of America.

De Groot, Doctor Engineer Cornelis Johannes, Chief of the Radiotelegraphic Service in the Dutch East Indies. B. at Den Helder, January 27th, 1883. Educ. as Mechanical Engineer at Technical High School, Delft, and afterwards at Karlsruhe, where he obtained the diploma of Electrical Engineer. During 1915-1916 took degree as Doctor in Technical Sciences at Delft University. Spent eighteen months in the service of the G.E.C. of Berlin and thence transferred himself to the Dutch East Indian Government, superintending the erection of various wireless stations in the Indian Archipelago. In 1915-1916 visited Europe on furlough and took Doctor's degree on the thesis of "Radiotelegraphy in the Tropics" a notable production which obtained him much *kudos* when subsequently published. A supplementary dissertation upholding the advisability and technical possibility of establishing direct radio communication between Holland and its Colonies won him the honour of having his Doctor's degree conferred *cum laude*, and he was subsequently instructed to carry into practical effect the measures he advocated in that essay. His initial experiments in establishing such communications met with success. Has made many contributions to radio literature, one of the best known being a monograph on "The Nature and Elimination of Strays," originally read before the Institute of Radio Engineers, New York.

Desbarats, George Joseph, C.M.G., B.Sc., Deputy Minister and Comptroller of the Canadian Naval Service, since June, 1910. B. Quebec, January 27th, 1861. Educ. Public Schools; Terrebonne College, Ecole Polytechnique, Montreal (honours and gold medal, 1879); Laval University (B.A.Sc., 1901). Engineer on construction of canals and other public works; assistant to late John Page, Chief Engineer of Canals; Inspector, Railway Construction, B.C., 1892-96; Engineer of Construction, Galops Canal, 1896-99; employed in hydraulic survey work, St. Lawrence River, three years; rebuilt and enlarged the Government shipyard, Sorel, Quebec, 1901; Acting Deputy Minister of Marine and Fisheries, Ottawa, 1908-9; Deputy Minister, 1909-10; Plenipotentiary for Canada at the Radiotelegraph Conference held at London, England, 1912. Member of the Canadian Society Civil Engineers, 1897; Councillor, 1907; Vice-President, 1909; Councillor, Ecole Polytechnique, 1909. Address: Ottawa, Canada.

Destruge, Guillermo, Director General of Posts and Telegraphs, Ecuador, February, 1898, to February, 1906, and from March, 1912, in which capacity he is still serving. Established duplex telegraphic system and telephones in Quito, the capital. The installation of wireless telegraphy in Ecuador has been instituted under his direction. President of the Radiotelegraphic Commission of the Republic. Author of several scientific publications. Address: Apartado No. 59, Quito, Ecuador, South America.

De Vasconcellos, Dr. Alexandre, State Secretary of the Portuguese Colonies.—B. November 28th, 1872. Graduated as a Doctor of Medicine in the Medical School at Lisbon. Joined the Portuguese Navy, 1894, where he gained a reputation as a physician and surgeon. After the proclamation of the Portuguese Republic in 1910 interested himself in politics, and as a member of Parliament specialised in Colonial subjects. Served in the Baruè Campaign, 1912. Chief Health Officer to the expedition sent to Cuamato when the Germans invaded Portuguese territory, 1913–15. His services won him the highest military distinction granted by the Portuguese Navy. On returning from the expedition to Angola was appointed Commissioner of the Portuguese Government to the Mozambique Company. Secretary of State to the Colonies, May 14th, 1918. In this capacity devoted considerable attention to the development of radiotelegraphy in the Portuguese colonies.

Dubilier, William.—B. July 25th, 1888, in the U.S.A. Consulting radio engineer and inventor. Devoted much attention to wireless telegraph, telephone, and high frequency experiments. Since 1904 Consulting radio engineer. Principal of the Dubilier Electrical Syndicate, Ltd., London, Eng., and of the Dubilier Condenser Co., Inc., New York. Inventor of the Dubilier Mica Condenser. Obtained over 150 patents and applications for wireless apparatus. Address: Aero Club, New York.

E

Eccles, W. H., D.Sc., A.R.C.S., M.I.E.E., Professor of Applied Physics and Electrical Engineering at the City and Guilds of London Technical College, Finsbury, E.C.; Vice-President of the Physical Society; Member of Council and Chairman of the Wireless Section of the Institution of Electrical Engineers; Examiner in mathematics at the London University, and honorary secretary of the British Association Committee for Radiotelegraphic Investigation. B. Furness, Lancs, 1875. Entered the Royal College of Science, South Kensington, in 1894. Three years later was appointed demonstrator in the Physics Laboratory at the College, and in 1898 graduated at the London University with first-class honours in Physics. In 1899 he entered Mr. Marconi's laboratory at Chelmsford and spent a great part of his time in the investigation of electrical oscillations of air wires and in "jiggers." Devised a laboratory method for testing and classifying coherers, and results of a later study of coherers were presented as one of his D.Sc. theses. In 1901 was appointed Head of the department of mathematics and physics at the South-Western Polytechnic, Chelsea, and afterwards University Reader in Graphics at University College, London. Address: 2, Ryder Street, St. James's, S.W.1.

Eichhorn, Gustav, Ph.D.—B. Düsseldorf (Germany), December 1st, 1867. Studied Physics. For ten years devoted himself to a business career. Returned to the profession of his choice and continued his interrupted studies. After three years at Berlin, Munich, and Zürich, took the degree (Phil. Dr.) at the last-named University. Entered a wireless telegraph laboratory. Appointed manager of experimental stations on the Baltic, where for about eighteen months he conducted a number of investigations. Contributor to various technical journals. Inventor of a device which is used in connection with wave meters and other instruments. Returned to Zürich, 1905, and launched the *Jahrbuch de drahtlosen Telegraphie und Telephonie*, 1907. Engaged in practical and theoretical work in wireless telegraphy and telephony.

Eisenstein, S. M.—B. Kief, Russia. Educ. Kief University. Studied at the University of Berlin and the Charlottenburg Polytechnic. First turned his attention to wireless telegraphy, 1900. Obtained his preliminary wireless patent and established a private experimental laboratory, 1904. General Soukomlinoff, then commanding the troops of the Kief Division, heard of the young wireless enthusiast and encouraged him to carry out experiments on a large scale, eventually prevailing on the Russian War Office to provide the young scientist with sites for the erection of stations. The action, taken in consequence by the War Office, resulted in the realisation of the necessity for forming a wireless company; the project speedily materialised and Mr. Eisenstein changed his headquarters from Kief to Petrograd. The new departure speedily justified itself, and in 1911 the original company coalesced with the Marconi Company, and the reconstructed Russian Organisation, with Mr. Eisenstein as Director and Principal Technical Adviser, assumed responsibility for the development of Russian wireless.

Erskine-Murray, James, D.Sc., F.R.S.E., M.I.E.E., F.I.Radio.E.—B. Edinburgh Oct. 24th, 1868. After six years' study and research under the late Lord Kelvin at Glasgow University entered Trinity College, Cambridge, as a research student Assistant Professor of Physics and Electrical Engineering in the Heriot-Watt College, Edinburgh 1896–8.

Appointed experimental assistant to Mr. Marconi 1898. Lecturer and Demonstrator in Physics and Electrical Engineering at University College, Nottingham, 1900. Lecturer in Electrical Engineering at the George Coates Technical College, Paisley, 1905. Consulting work in radiotelegraphy 1905. Lecturer on Radiotelegraphy at the Northampton Institute, London, 1907–11. Contributed papers to numerous learned societies. Author of several works on wireless telegraphy. Partner in the firm of Clark, Forde, Taylor, and Erskine-Murray, consulting engineers, 1913–18. Joined the Royal Naval Volunteer Reserve 1917, with rank of Lieut.-Commander. Now serving with the Royal Air Force in charge of the design of wireless instruments and of experimental work. Address: 16, Elmfield Road, Bromley, Kent; Telephone, Bromley 858; Club, Caledonian.

Ewen, Harry Alexander.—B. Aberdeen, December 17th, 1877. Educ. Aberdeen Grammar Sch.; Liverpool Institute. Received Engineering training at Heriott-Watt College. Medallist in Elec. Eng. and Elec. Eng. Hons. 1901–1902. Joined Engineering Staff of Marconi's W/T Co. 1902. Appointed Wireless Telegraph Expert to the Brazilian Navy 1910; later rejoined Marconi's W/T Co., and appointed Chief of Drawing and Design Dept.

F

Farrand, C. L.—B. Newark, N.J., October 22nd, 1891. Educ. Central High School, Philadelphia, Pa. Wireless operator and instructor 1909-13. Inspector of construction work, 1913, testing and designing of coastal stations. Assistant to Mr. H. Shoemaker, the research engineer of the Marconi Laboratory, Aldene, N.J. Engineer-designer in Aldene, N.J., 1917, especially devoting his attention to radiotelegraphic research and design. His research work has been particularly associated with the De Forest Valve litigation, the development of valves, and the elimination of static. His activities have been mainly exercised in connection with the design of commercial and naval quenched spark apparatus, regenerative valve receivers and regenerative valve transmitters, both telephonic and telegraphic.

Ferrié, General Gustave, Technical Director of French Military Radiotelegraphy. Officer of the Legion of Honour, D.Sc. of the University of Oxford, Companion of St. Michael and St. George, Commander of the Crown of Italy, Officer of the White Eagle of Serbia, Holder of the Distinguished Service Medal of the United States, Commander of the Double Dragon of China, Officer of La Couronne. B. at St. Michel de Maurienne (Savoy), November 19th, 1868. His connection with wireless telegraphy started February, 1899, when he was present during experiments of Senatore Marconi between Wimereaux and Dover. Initiated French Military Radiotelegraphic Service in 1900. Was member of French Delegation to the International Electrical Congress of St. Louis in 1904. Member of the French Delegation to the International Radiotélégraphic Conference of London (1912), Appointed General Secretary of the International Time Conference, Paris (1913). He has, in the course of a brilliant career, written a large number of monographs and periodic contributions dealing with radiotelegraphy and kindred subjects, both from a technical and organisation point of view. Address: Ministère de la Guerre, Paris.

Fessenden, Reginald Aubrey.—B. Milton, Canada, October 6th, 1866. Educ. New York, and Port Hope, Ontario. Inspecting engineer to the Edison Company, N.Y., 1866. Took up teaching work and conducted classes in physics and electrical engineering at Western University, 1892. Professor of Electrical Engineering at Western University, Philadelphia, 1893. Special Agent to the U.S. Weather Bureau, 1900. Has devoted much attention to the development of a system of wireless telegraphy known by his name, and has also carried out important experiments in wireless telephony. Contributor of articles on wireless telegraphy and telephony to many technical journals.

Field, Rear-Admiral F. L., C.B.,

C.M.G., Director of Torpedoes and Mining at the British Admiralty; Member of Committee (appointed November, 1919) to advise British Government on Imperial W/T Communications. B. 19th April, 1871. Entered Royal Navy July, 1884; promoted Lieut. 1893; qualified as Torpedo Lieut. 1896. Landed in expedition for Relief of Legations at Pekin from H.M.S. "Barfleur," 1900. Mentioned in despatches; wounded at taking of Tientsin Native City. Promoted Commander 1902; Captain 1907; Commanded H.M.S. "Duncan," 1910; Superintendent of Signal Schools, 1912; Capt. H.M.S. "Vernon" (Torpedo School) 1914. Captain H.M.S. "King George V." at Battle of Jutland; mentioned in despatches, awarded C.B. (Military division). Chief of Staff to Admiral Second in Command Grand Fleet, 1916. Awarded C.M.G. for this service. Appointed Director of Torpedoes and Mining at Admiralty 1918. Promoted Rear-Admiral Feb. 11th, 1919

Fisk, Ernest Thomas, M.I.RadioE.—B. Sunbury-on-Thames, August 8th, 1886. Educ. Primary and High Schools. Studied physics, mathematics and commercial subjects. After two years with Messrs. Frederick Walton & Co., he entered the British Telegraph Service. Joined the Marconi Company in England (1905). Temporarily engaged in engineering branch of the American Marconi Company, erecting stations on ship and shore. Undertook a special mission to the Arctic icefields, 1909, and demonstrated the possibilities of wireless communication with Newfoundland Sealing Fleet. Visited the Antipodes, 1910, in R.M.S. "Otranto," and demonstrated the use of the Marconi apparatus for the Orient Mail Line of steamers. Again visited Australia, 1911. General Manager with a seat on the board of directors of Amalgamated Wireless (Australasia) Limited, 1913. Revisited England, 1916. Shortly after return to Australia, accepted position as Managing Director of the Company. While in England he undertook to test possibility of direct wireless communication between England and Australia. Commenced experiments in Sydney, early 1918, and on September 22nd of that year succeeded in receiving the first direct wireless messages from England to Australia with apparatus designed and constructed by himself and his assistants. Gave the first public demonstration of wireless telephony in Australia before the Royal Society of New South Wales. Re-organised manufacturing work, and manufactured and supplied from Sydney all wireless telegraph equipment for British ships built in Japan, Hong Kong, etc., also supplied all requirements of Australasian Mercantile Marine during the war. Managing Director of the Australectric Company, an important electrical engineering and manufacturing concern. Founder and initiator of "Sea, Land and Air," the first journal in the Southern Hemisphere to deal with aviation and wireless. Established the Australasian branch of the Wireless Press. Member of the Electrical Association of Australia, President of the Wireless Institute of Australia (New South Wales Section), member of the Sydney Chamber of Commerce and the Chamber of Manufacturers, Member of the Executive Committee, Australasian Industries Protection League. Member Provisional Committee appointed to consider the formation of the Chamber of Science and extending application of science to industry.

Fleming, John Ambrose, M.A., D.Sc., F.R.S., University Professor of Electrical Engineering, University of London (1912). B. Lancaster Nov. 29th, 1849. Educ. University College School, London; University College; R. School of Mines. Sometime Fellow of St. John's College, Cambridge; Hughes Gold Medallist Royal Society. In 1880 Lecturer in mechanics and applied science, Cambridge University. First Professor of Mathematics and Physics (1881), University Coll., Nottingham. First occupant of Pender Chair of Electrical Engineering, University College, London (1885); Vice-President of Wireless Society of London. Later appointed Scientific Adviser to the Edison Electric Light Company.

Publications: Numerous contributions to scientific literature and research. Author of well-known text-books, particularly on wireless telegraphy. Twice awarded Institution Premium of Institution of Electrical Engineers; also silver medal of Royal Society of Arts. Widely known as inventor of the Thermionic Valve or Fleming Valve, the judicial decisions on which have declared it to be a pioneer invention of unusual utility, and one that has enormously aided the development of wireless telegraphy.

Forberg, Olaf E, Director of Telegraphs, Iceland. B. November 22nd, 1871, in the Province of Finmark, Norway. Early attached to the Norwegian Telegraphic Service, first as a Telegraphic Clerk, later as the head of a station; Manager of the Controlling Station, Veblungsnes, in the Romsdal, 1900. Erected several new telegraphic plants in Norway, 1893-1904. Went to Iceland on an inspection, 1905, and in 1906 he constructed the telegraphic line from Reykjavik to Seydisfjord. Superintended the erection of stations and organisation of the telegraphic system in Iceland. Director of Telegraphs in Iceland, 1907, and controls both the wired and wireless nexus of the island. Member of the Engineers' Association of Iceland. Knight of Dannebrog, 1907. Address: Director of Telegraphs, Reykjavik, Iceland.

Franklin, Charles Samuel.—B. 1879. Received engineering and scientific training at Finsbury Technical College, under Professor Sylvanus Thompson. After some time spent in electrical work, first at Manchester and afterwards with the Norwich Electricity Company, joined Marconi's Wireless Telegraph Company (then known as the "Wireless Telegraph and Signal Company") 1899, and still remains in their service. He has during recent years been engaged in conducting experimental and research work on behalf of Senatore Marconi, and has a number of important patents to his credit.

Frouin, M.—Director of French Telegraphs, one of his country's representatives at the International Radiotelegraphic Conference, London, 1912.

G

Gentil, Captain Antonio Alves Soares Branco, Member of Technical Committee of Portuguese Naval Wireless Telegraphy. B. March 7th, 1874. Educ. at the Polytechnic and Naval Schools. Between 1893 and 1909 filled various Naval posts in Angola and Mozambique. Qualified as Torpedo Operating Officer at the Naval College of Val de Zebro in 1909, appointed Instructor of Wireless Telegraphy at the Naval College in 1910. Qualified as Submarine Commander in 1915. In 1916 became member of the Technical Committee of Naval Wireless Telegraphy appointed to investigate and make recommendations concerning wireless in all Portuguese Colonies. Address: Portuguese Admiralty, Lisbon.

Geoghegan, Samuel, M.I.M.E., M.I.C.E. (Ireland). Director of Marconi's Wireless Telegraph Co., Ltd. In Loco. Dept. of Ottoman Railway Co., Smyrna (1869–1871); engaged upon loco. work and bridge foundations in Indian Public Works Dept. (1871–1874). Member of Council, Royal Dublin Society. Chief Mechanical Engineer to Messrs. Arthur Guinness & Co., Dublin, 1875–1905. Address: St. Margarets, Donnybrook, Co. Dublin.

Girardeau, Emile. — Managing Director, Société Française Radio-Electrique and Cie Gle de Télégraphie sans Fil. Director of the Cie d'Exploitation Radio-Electrique. B. 1882. Educ. Ecole Polytechnique. Joined the Army and served as an officer in the Engineers. Author of various works on a number of subjects relating to wireless telegraphy. Played an important part in the creation and organisation of the Société Française Radio-Electrique, of which he is the founder.

Glazebrook, Sir Richard Tetley, Kt., C.B., M.A., D.Sc., F.R.S.—B. Liverpool, Sept. 18th, 1854. Educ. Trin. Coll., Cambridge. Fifth Wrangler. Studied Physics as Graduate at Cambridge Laboratories under Clerk Maxwell. Fellow of Trinity Coll., Cambridge (1877). Principal of

University Coll., Liverpool (1898–99). First Director of the National Physical Laboratory (1899–1919). Chairman of the Advisory Committee for Aeronautics; Past President of the Inst. of Electrical Engineers. Medal of the Royal Society of Arts (1918). Member of Technical Committee inquiring into Imperial Wireless scheme. Publications: Numerous works on Physical Optics, Laws and Properties of Matter, text-books on Heat, Light, Mechanics and Electricity, as well as numerous papers in Scientific and Technical Journals. Address: Colon End, 63, Grange Road, Cambridge.

Gold, Lieut.-Col. E., D.S.O., F.R.S., Assistant Director of Meteorological Office. B. Berkswell, Warwickshire, July, 1881. Educ. King Henry VIII.'s Grammar School, Coleshill; Sir Josiah Mason's College, Birmingham; St. John's College, Cambridge. (Third Wrangler 1903.) Part II. Natural Science Tripos 1904. Lecturer in Mathematics, City of London College, Moorfields, 1904; Fellow St. John's College, Cambridge, 1906; Superintendent, Instruments Division, Meteorological Office, 1906; First Schuster Reader in Dynamical Meteorology (1907); Superintendent of Statistics, Meteorological Office (1910). Gazetted Capt. June, 1915, and attached G.H.Q. as Meteorologist to R.F.C. D.S.O. for services in Battle of Loos and promoted Major. Appointed to command of new Meteorological Section, R.E. Mentioned in dispatches five times; promoted Lieut.-Col. March, 1918. Represented British meteorology in Aeronautical Convention at Peace Conference, 1919. Research: Identification of negative "ions" in flames with "electrons" (1905); relation between barometric pressure and wind velocity (1906); atmospheric radiation (1907). Publications: Report on existing state of knowledge of upper atmosphere (read British Association, 1919); "International Kite and Balloon Ascents" (1911), which gained German Meteorological Society's prize open to all the world. Address: 8, Hurst Close, Bigwood Road, Hampstead Garden Suburb, London, N.W.

Goldschmidt, Professor Dr. Rudolf. B. March 19th, 1876, at Neu-Bukow, Mecklenburg, Germany. Educ. Wismar Municipal School. Studied engineering at Charlottenburg and Darmstadt Technical High School. Engineer in the laboratory of the A.E.G. in Berlin, 1900. Chief laboratory engineer and designer in Prague, 1901-2. Chief engineer and designer at Cromptons and Co., Ltd., Chelmsford, 1902-5; similar position with Brit. Westinghouse El. and Man. Co., Manchester, 1905-7. Lecturer at Darmstadt Technical College, 1907. Here he practised as a consulting engineer, and also pursued the development of several inventions, chiefly occupying himself with the invention and design of high-frequency alternators for wireless telegraphy. Established (1911) two large wireless stations at Elvese, Province of Hanover, and Tuckerton, New Jersey, U.S.A., for wireless communication between Germany and America. Address: Berlin-Westend, 45, Lindenallee.

Goldsmith, Prof. Alfred N., B.Sc., Ph.D. B. New York City. Graduated from the College of the City of New York and Columbia University. Author of "Elements of Physics," "The Transmission of Canal Rays through Thin Partitions," "Radio Engineering at the College of the City of New York," "The Engineering Measurements of Radiotelegraphy," "Radiotelephony," and other works. Research worker in radio communication, and particularly in radiotelephony. Director of Radio Engineering works at the College of the City of New York. Editor of the "Proceedings of the Institute of Radio Engineers," Chairman of the Standardisation Committee of the Institute of Radio Engineers (1915), Secretary of the Institute (1918-1919), and Member of Board of Direction of the Institute. Fellow of the Institute of Radio Engineers, Member of the American Institute of Electrical Engineers, Member of the American Physical Society. During 1917-1918 Technical Director of the U.S. Signal Corps School of Radio and Multiplex Telegraphy, New York, besides being associated with the U.S. Naval Radio Compass School. Director of

Research for the Marconi Wireless Telegraph Co. of America, and for the Pan-American Wireless Telegraph and Telephone Co. Address: The College of the City of New York.

Gomez, Rear-Admiral Sir Luis, K.C.V.O., Chief of the Chilian Naval Commission in London. B. 1864. Entered Chilian Navy and took part in war against Peru and Bolivia in 1879-1881, receiving a commission in the Naval Service at the close of the war. During the Russo-Japanese war (1904-5) acted as Naval Attaché in Japanese Waters. Commanded Corvette "General Baquedano," training ship for midshipmen, off the coast of China and Korea. Acted as Military Dictator at Valparaiso during the emergency which followed the fearful earthquake in 1906, receiving on that occasion a vote of thanks from the Foreign Colony. Appointed Member of Special Mission of the Chilian Government to the Court of St. James in November, 1919. Address: Chilian Naval Commission, 56, Victoria Street, London, S.W.1.

Gottwaldt, Commander B. L., late Inspector of W/T, Norwegian Navy Department. Technical Manager, Norwegian Wireless Company (Norsk Marconikompani). B. Christiania 1880, entered Naval Academy, Norwegian Navy, 1898. Graduated sub-lieutenant 1901. Attended the Military Academy of the Royal Navy 1901-4, afterwards the Technical College, Charlottenburg, Berlin. At the latter studied electrical engineering, telegraphy, telephony, and wireless telegraphy. Visited (1906) England on behalf of the Norwegian Admiralty to attend to some special work with Messrs. Armstrong, Whitworth Co., Newcastle-on-Tyne. Returned to Norway and placed in charge of W/T in the Royal Norwegian Navy, where he was responsible for the erection of naval, land and ship stations. Appointed Commander 1912. Entrusted with the control and test of wireless apparatus ordered in England and Germany by the Norwegian Government. One of the Norwegian delegates at the International Radio Conference in London, 1912. He has written a number of articles, and three books on wireless. Address: 15, Baldersgate, Kristiania.

Gray, Andrew, A.O.T.C., Assoc. M.Inst.C.E., M.I.E.E., Chief Engineer of the Marconi Parent Company (since 1910). B. Glasgow, 1873. Educ. Glasgow University; Royal Technical College. Diploma of latter in electrical engineering. Served as assistant to late Professor Andrew Jamieson, of Royal Technical College. Joined the West India and Panama Telegraph Company, Ltd. (1895), serving respectively as asst. electrician, chief electrician, and telegraph engineer. Entered Marconi Company 1899. Introduced Marconi system to Hawaiian Islands. Organised telegraph working and trained native operators of Inter-island Telegraph Company of Honolulu. Appointed Chief of Staff to the Marconi Companies, and in that capacity organised the working of the ship and shore wireless service, designed the original 1½ K.W. Ship Set, and supervised the ship and shore operating until 1906, when the engineering and traffic work were separated. Address: 78, Creffield Road, Acton, W. 3.

Grenfell, Wing Commander George Pascoe, D.S.O. (1917). B. 1883. Educ. privately. Successively on staffs of Eastern Telegraph Co., Ltd.; Amalgamated Radio Telegraph Co., Ltd. (De Forest & Poulsen Systems); British Radio Delegraph Co., Ltd. Went overseas 1915 in charge of Wireless in R.F.C., Middle East. Served in Egypt, Senussi campaign, and Salonika. Transferred to H.Q. Staff—R.F.C., B.E.F., France, end of 1916. In charge of W/T (Communications and Artillery Co-operation). Mentioned in dispatches 1917. Returned to England and joined Staff of Director of Air Organisation, Air Ministry, as S.O. 1, June, 1918. Appointed member of W/T Board June, 1918. Took command of W/T Experimental Establishment. Address: R.A.F., Biggin Hill, Kent, Dec., 1918.

Grut, Torben, Lieut.-Col.—Chief of Military Wireless Service, Denmark, since July, 1914. B. Copenhagen, Aug. 23rd, 1865. Graduated in Philosophy (1883). Sub-Lieutenant and Lieutenant (1886) same

year. Asst. to General of Engineers 1892–1896; teacher of technical mechanics to Senior Class of Military Academy, Copenhagen, 1893–1902; Captain, 1898; Adjutant to H.M. King Christian IX. (1902–1906); Chief of Staff to Engineer Corps, 1906; Chief of Third Engineer (Telegraph) Battalion 1914; promoted Lieut.-Col. same year. Director of the Board of the Siam Electricity Co., Ltd., Bangkok; member of the Military Telegraph and Telephone Commission (1917). Address: Lyngby, Denmark.

H

Hammond, John Hays, Jr. B. San Francisco, April 13th, 1888. Educ. Preparatory Schools in England and the U.S. Graduated from the Yale-Sheffield Scientific School, 1910. Working ever since on the development of the system of radio control of torpedoes and other moving bodies. Originator of the system of aerocoastal patrol, comprising aeroplanes equipped with wireless, which has received the endorsement of President Wilson, the Secretary of Navy, and the Secretary of War. Author of a four-volume treatise on the Art of Teledynamics. Treasurer of the Institute of Radio Engineers, and Manager and Chairman of the Committee on Admissions. Associate Member of the American Society of Mechanical Engineers. Delegate to the London International Radio Telegraphic Conference, 1912. Member of the American Institute of Electrical Engineers. Received honorary degree of Doctor of Science at George Washington University, June, 1919. Invented system of aerial radio surveying and mapping, which has been adopted by the Bartlett Expedition for Polar Basin surveying. Inventor of thermite incendiary shell, testing by Bureau of Ordnance, War Department. Inventor of the Radiodynamic Torpedo, testing by U.S. War Department. Address: Hammond Radio Research Laboratory, Gloucester, Mass.

Harrison, Lieut.-Col. Norman, C.M.G., D.S.O., M.I.E.E. B. 1873. Son of the late Richard Thomas Harrison, of Johannesburg. Educ. in Natal. Served in South African War, and with the Royal Engineers during the European War, 1914-19, as Director of Army Signals in German South-West Africa, and as Assistant Director of Army Signals in France, 1916-19. Engineer-in-Chief of Posts and Telegraphs, Union of South Africa since 1910. Addresses: (1) G.P.O., Pretoria; (2) Pretoria Club, Pretoria.

Hayashi, Professor Fusakichi, Ph.D., Professor at the Kyushu Imperial University, June, 1919.—B. Tokushima prefecture, 1879. Graduated from the Science College of the Tokyo Imperial University, July, 1903. Studied at the University Hall, and at Göttingen University, 1909-1912, and Jena University, 1912-1913. After engagement from the Governors of Kiangsu and Shangsi provinces as instructor at normal schools for several years, served in the Navy Dept. and engaged in studies on radiotelegraphy, January, 1914. Promoted Naval Engineer, June, 1914.

Hinks, Arthur Robert, M.A., F.R.S., 1913; Secretary, Royal Geographical Society since 1915, and Gresham Lecturer in Astronomy since 1913. B. London, May 26th, 1873. Educ. Whitgift Grammar School, Croydon; Trin. Coll., Cambridge. Second Asst., Cambridge Observatory, 1895; Chief Asst., 1903–13; Demonstrator in Practical Astronomy, 1895–1913; R. Geog. Soc. Lecturer in Surveying and Cartography, 1908–13; Secretary of the R. Astronomical Soc., 1909–13, Vice-Pres., 1913; Asst. Sec., R.G.S., 1913–15; Membre du Comité International Permanent pour l'exécution Photographique de la Carte du Ciel since 1909; Prix Leconte de l'Académie des Sciences, 1910; Gold Medal of the R. Astronomical Soc., 1912. Publications: Many papers on the Determination of the Solar Parallax and other astronomical subjects (Monthly Notices, R.A.S., etc.); Catalogue photographique des Etoiles observées avec la Planète Eros. . . . (Académie des Sciences, 1913); Astronomy, H.U.L., 1911; Map Projections, C.U.P., 1912, Maps and Survey, C.U.P., 1913, etc. Address: 17, St. Petersburgh Place, W. 2.

Hogan, John V. L B. Philadelphia,

Pa., U.S.A. Educ. Scientific School of Yale University, specialising in physics and mathematics. Assisted Dr. Lee De Forest in his work on experimental Radiotelephony, and in the development of the grid audion, 1906 and 1907. Joined the staff of the National Electric Signalling Company at Brant Rock, Mass, 1909. Appointed Chief Research Engineer of that Company, 1914. In 1917 the Company changed its name to the "International Radio Telegraph Co.," and in 1918 he was appointed manager. Author of "The Heterodyne Receiving System," "Wireless Telegraphy in Railroad Service," "Transatlantic Radiotelegraphy," and numerous other articles and papers published in the Proceedings of the Institute of Radio Engineers, the "Electrician" (London), the "Electrical World," the "Jahrbuch der D.T.U.T.," etc. Fellow of the Institute of Radio Engineers, and Vice-President since 1916. Member of the American Association for the Advancement of Science, of the American Institute of Electrical Engineers, and honorary member of the Radio Club of America. Chairman of the Standardistation Committee of the Institute of Radio Engineers since 1916. He is the holder of a number of patents embodying inventions relating to radiotelegraphy, and has been identified with important patent litigation as principal technical witness. Address: C/o International Radio Telegraph Co., 326, Broadway, New York, U.S.A.

Holmstroem, J. Gunnar.—Director of Radiotelegraphic Instruction, Stockholm, Kt. of "Vasa" Order. B. Stockholm, April 23rd, 1874. Passed through Poly. Acad., Stockholm, 1896. Assistant Royal Swedish Telegraph Dept., 1892. Teacher at Swedish Artillery and Engineers' College, 1904, and College for Naval Officers, 1908. Head of the Telegraph Department's School, 1902. Publications: "Lārobok in Telegrafi," 1914, and "Handbok i Radiotelegrafi," Stockholm, 1908. Address: Malmskillnodsgatan 19 B, Stockholm.

Hooper, Commander Stanford C., United States Navy.—In charge of radio material, construction, supply, and development in the Bureau of Steam Engineering attached to the U.S. Navy. B. August 16th, 1884, Cloton, Cal. Educ. at San Bernardino, California. Started his career as telegraph operator in the Southern Pacific Company, afterwards transferring to the Postal Telegraph Company. Entered the Naval Academy, Annapolis, Md., September 6th, 1901. Graduated January 31st, 1905. Served as midshipman on the cruiser "Chicago," destroyer "Perry," and monitor "Wyoming." Ensign, 1907, lieutenant, 1910, lieutenant-commander, 1915, commander, 1918. Instructor of electrical engineering, physics, and chemistry at the U.S. Naval Academy 1910-1911. Fleet Radio Officer of the United States Atlantic Fleet, 1912-1913, taking part in the capture of Vera Cruz, Mexico. Early in the war acted as observer in Europe. In charge of the Radio Division Bureau of Steam Engineering, Navy Department, 1915-1917. After commanding the destroyer "Fairfax" in the Atlantic during the earlier part of the year returned to take up duties in the Navy Department, 1918. Address: Navy Dept., Washington, U.S.A.

Hope-Jones, Frank, Chairman, Wireless Society of London. B. 1867. From 1890 to 1895 associated with his elder brother, Robert Hope-Jones, in some of his earliest applications of electricity to organ-building. Has established the business of electric time service on a scientific basis. Member of the Institution of Electrical Engineers and the British Horological Institution. Author of numerous contributions to technical journals and to the Proceedings of Scientific Societies. Address: 32 and 34, Clerkenwell Road, E.C.1.

Howe, Prof. George William Osborn, D.Sc., M.I.E.E. B. 1875, Charlton, Kent. Educ. the Roan School, Greenwich, Woolwich Polytechnic, Durham University. Nine years with Siemens Bros., at Woolwich, and Siemens and Halske, at Charlottenburg. Two years Lecturer at Hull Technical School. Lecturer and later Assistant-Professor of

Electrical Engineering at the City and Guilds Engineering College, which forms the engineering section of the Imperial College of Science and Technology at South Kensington. D.Sc. of Durham, hon. D.Sc. of Adelaide University. Whitworth Scholar. Has read several papers on Radiotelegraphy before the Royal Society, the British Association, the Physical Society, etc. Awarded the silver medal by the Royal Society of Arts (1912) for his paper on "Some Recent Developments in Wireless Telegraphy." Fellow of the Physical Society. Member of the Radiotelegraphic Research Committee of the British Association and of the Wireless Sectional Committee of the Institution of Electrical Engineers. Address: City and Guilds Engineering College, South Kensington, London, S.W.

Hoyle, Lieut. Bertram, Assistant Lecturer in the Victoria University and College of Technology, Manchester. B. in Oldham. Educ. at the College of Technology, Manchester (of which he is now an Associate), and at the Victoria University, Manchester, where in 1907 he obtained the Certificate and Diploma in Technology. M.Sc. Tech. of Victoria University and an A.M.I.E.E. Has served with Messrs. Henry Simon, Ltd., Manchester, and with Messrs. S. Z. de Ferranti, Ltd., Hollinwood. In 1911 appointed Assistant Lecturer and Demonstrator in Electrical Engineering at the College of Technology, Manchester. Had charge of the design and erection of the wireless station with which the School of Technology is equipped. Enlisted early in 1915 as a motor cycle despatch rider, and served on the Western Front. In September, 1915, however, was gazetted Lieut. R.N.V.R. Is author of "Standard Tables and Equations" and of a number of technical essays and monographs. Address: 45, Frederick Street, Oldham.

I

Illingworth, Albert Holden, P.C., M.P., British Postmaster-General since Dec., 1916. (L.) Heywood Div. S.E. Lancs, since 1915. B. 1865. Educ. London International College and French Switzerland. Partner in Daniel Illingworth & Sons, of Bradford. Pres. Bradford Chamber of Commerce 1910. As Postmaster-General is in supreme direction of Wireless Telegraphy as far as United Kingdom is concerned. Address: Denton Park, Ben Rhydding, Yorks; 18, Chesham Place, S.W. 1.

Isaacs, Godfrey C.—Educ. England, France, and Germany. He began life in his father's business, and a few years later he was manager of the great concern which he had entered as a lad. Managing Director of Marconi's Wireless Telegraph Co., Ltd., and the Marconi International Marine Communication Co., Ltd., 1910. Addresses: Lyne Grove, Virginia Water, Surrey, and 31, Wellington Court, Knightsbridge, S.W.1.

J

Jackson, Admiral Sir Henry Bradwardine, G.C.B., K.C.V.O., F.R.S., M.I.E.E., Grand Officer of Legion of Honour. B. Barnsley, Jan. 21st, 1855. Entered Royal Navy at age of thirteen. Promoted Capt. 1896; Controller of the Navy 1905–8; Commanded 6th Cruiser Squadron, Mediterranean, 1908–10; Chief of War Staff 1912–14; First Sea Lord, Admiralty, 1915–1916. Whilst Commander of H.M.S. "Edinburgh" conducted numerous experiments in wireless telegraphy by inductive methods, and on meeting Mr. Marconi in 1896 turned his attention to the Marconi system, employing Hertzian waves. Responsible for the progress of W/T in the Navy until 1906, and during this period was directly concerned with many improvements upon the original apparatus. Has served on numerous technical committees in connection with the equipment and design of warships. Assoc. of Inst. of Naval Architects; Vice-President of Wireless Society of London.

Janet, Paul.—Professor of Physics, University of Paris, Director of the Central Laboratory and of the High School of Electricity. B. January 10th, 1863, in Paris. Studied at the Lycée Louis-le-Grand and the High School. Member of the French Society of Physics, the International Society of Electricians, and the Society of Civil Engineers of France.

Professor of Physics at the University of Grenoble, 1886-1894. Author of several important works. First to make a successful experiment in electric resonance by means of high-frequency currents, 1892; this is the phenomenon used to-day in wavemeters.

Jenner, Axel. B. 1885. Student 1904. Assistant at the Swedish Telegraph Service 1905 Passed the course for superintendents of the wireless stations 1916. Since 1916 superintendent of the wireless station at Boden, Sweden. Address: Boden, Sweden.

Jotikasatira Hang, Chief of the Wireless Department of the Naval General Staff, Siam. B. at Bangkok, September 27th, 1876. Educ. at Bangkok and at Penang. In 1890 he was sent to Europe to be educated as an engineer. He studied seven years at Erfurt, and entered in the Technische Hochschule at Hanover in 1897. On passing the final examination of that school in 1902, he returned to Siam and joined the Siamese Navy as an Engineer-Lieutenant. 1907-12, an instructor in the Naval Cadet School. Awarded the title of Luang Nava Vichitr, 1911. Joined the Naval General Staff as the Chief of the Wireless Department, 1912. Promoted Commander 1918. Address: Bangkok.

K

Kajima, President Akira. — B. Tokyo, 1883. Graduated from the Greek Catholic Mission School, Tokyo, 1904, and became publisher of a religious magazine. Interpreter at the French Embassy from 1905 to 1906. Received a medal in recognition of distinguished services. Joined the editorial staff of the *Chuo Shimbun* in 1906 and that of the *Kokumin Shimbun* in 1908. Established the Japanese Wireless Press Agency in 1911 and the Nippon Radio Apparatus Manufacturing Company, 1915. Started a monthly magazine named *Musen no Nippon*, or Wireless Press, in 1918. Office address: 1280, Shimo Shibuya, suburb of Tokyo. Private residence: 40, Kobinata-Daimachi 1-chome, Koishikawa, Tokyo.

Kadöka, Hayao.—B. Tokyo, March, 1883. Graduated from the Tokyo Imperial University, July, 1906. Studied at the Earthquake Prevention Investigation Commission in the Dept. of Education, November, 1908. Lecturer at the Science College of the Tokyo Imperial University, March, 1909. Served in the Army, for researches on radiotelegraphy. Proceeded to Europe and America for inspection of the war-time condition of radiotelegraphy, 1917-1918. Since 1911 designed several radio stations.

Kennedy, Sir A. B. W., F.R.S.—B. London, March 17th, 1847. He has had great mechanical engineering experience. Some time President of the Institution of Civil Engineers, and the Institution of Mechanical Engineers. Professor of Engineering at University College, London, 1874-1889, and founded there the first "Engineering Laboratory." Designed electric lighting and power stations for many companies and corporations, and has also been engaged in railway and constructive work. Knighted 1905 for his services to the Admiralty. Member of the Technical Committee appointed by the Postmaster-General to consider the Imperial Wireless scheme. Civilian Member of the Ordnance Committee. During the war was Member of the Munitions Inventions Panel, and vice-chairman of the Anti-Aircraft Equipment Committee (Ministry of Munitions). Consulting electrical engineer to the L.N.W.R., L.S.W.R., and the London County Council. Address: A7, The Albany, Piccadilly.

Kennelly, A. E. — B. Calaba, Bombay, December 17th, 1861. Educ. in England, Scotland, Belgium, France and Italy. Past-President of the American Institute of Electrical Engineers, Past-President of the American Association of Illuminating Engineers; President, in 1916, of the Institute of Radio Engineers; Vice-President of the International Electrical Congresses, Paris and Turin; General Secretary of the Congress at St. Louis, Mo., U.S.A. Left school in 1875 to become a telegraph operator in the Eastern Telegraph Company. Chief Electrician on Cable Ship 1881; Senior Electrician ship staff, E.T.C., 1886. Principal

electrical assistant to Thomas A. Edison, in the laboratories at Orange, N.J., 1886–92, Consulting Engineer in Philadelphia. In partnership with E. J. Houston, of the Thomson-Houston Company 1893–1900. Engineer-in-Chief when the cables were laid from Vera Cruz to Campeche, 1902. Professor of Electrical Engineering at Harvard University and also at Massachusetts Institute of Technology, since 1914. Corresponding-Fellow of the British Association for the Advancement of Science; honorary Member of the Institution of Electrical Engineers of London, and has twice received one of its premiums for papers. Director of Research Division of the Electrical Engineering Department, Massachusetts Institute of Technology, and Fellow of the American Academy of Arts and Sciences. He has written twenty-three books as author or collaborator, one of which is considered a standard elementary exposition of wireless telegraphy, and is author of more than 120 scientific papers. Honorary degrees include the S.D. of University of Pittsburg and A.M. degree of Harvard University. Some time Chairman and Secretary of Standards Committee, American Institute of Electrical Engineers, President and Secretary of the American Committee of the International Electro-Technical Commission. Has specialised in alternating currents. Address: Harvard University, Cambridge, Mass., U.S.A.

Kift, A. A.—B. London, 1881. Educ. City of London School and Finsbury Technical College. Joined Marconi Company, 1902. Acted as erecting engineer supervising the installation of many of the earlier ship stations, including those on board the first vessels of the White Star fleet to be equipped. In charge of the installation of the Post Office Wireless Stations at Lochboisdale, Tobermory and Bolt Head. Appointed Chief of the Estimating Department of Marconi's Wireless Telegraph Company, 1911.

Kimura, Shunkichi.—B. 1866. Graduated Scientific College of the Tokyo Imperial University, in the department of Physics, 1888. Lecturer of the First High School in Tokyo. Studied Mathematical Physics in Harvard and Yale Universities, 1893-1895. Received the degree of Ph.D. (Yale), 1895. Member of Sigma Xi Society. Visited Holland. Cofounder with Dr. Molenbroek, assisted by Professor Tait, of Edinburgh, and Dr. Joly, of Dublin, of the Association for Promoting the Study of Quarternions and Allied Subjects. Returned to Japan. Professor of the Second High School in Sendai. Transferred to the Imperial Japanese Navy, 1901, to investigate wireless telegraphy for naval use. Invested with Order of Rising Sun (5th Class), 1903. Invested with Order of Rising Sun (3rd Class) with annuity, 1906. Fellow of the Royal Society of Arts, 1906. Japanese delegate to the International Wireless Telegraph Conference, Berlin, 1906. Retired from the Navy, 1912. Patent Attorney, with office at the Mitsui Building, Honkawayacho, Nihonbashi, Tokyo. Adviser to various companies, including the Nippon Radio Works. Engaged in the litigation for the General Electric Company against some Japanese firms on the infringement of the patents with respect to the ductile tungsten. Author of several papers on wireless telegraphy. Address: Momosono, Nakano, Tokyo.

King, Professor Louis V.—B. Toronto, Ontario, 1886. Educ. Montreal High School. Gained the degree of B.A. at McGill University with first-class honours and gold medal in mathematics and physics, 1905. Scholar of Christ College, Cambridge, 1906. Graduated at the same University with first-class honours in mathematical tripos. Lecturer in Physics at McGill University, 1910; Assistant Professor of Physics, 1912. Awarded the D.Sc. degree of the McGill University, 1915. Fellow of the Royal Society, Canada. Associate Professor of Physics. Investigated submarine acoustics for the Electrical and Submarine Committee of the British Board of Inventions, 1915. Engaged for some time in important researches on the efficiency of fog signal machinery and the measurement and distribution of sound. President of Section III. (Mathematics, Physics and Chemistry) of

the Royal Society of Canada, May, 1919. Address: McGill University, Montreal, Quebec, Canada.

Kojima, Chief Engineer, Kiyoshi.—B. Tokyo, January, 1889. Graduated from the Science College of the Kyushu Imperial University, July, 1915. Entered the service of the Department of Communications and engaged in scientific researches at the Electrical Laboratory under Dr. Wichi Torikata. Joined Nippon Radio Apparatus Manufacturing Company as chief of Engineering Department, April, 1916.

Kolster, Frederick A.—B. Geneva, Switzerland, January 13th, 1883. Educ. Public Schools of Cambridge, Mass., and at Harvard University. Assistant to John Stone Stone 1902-1908. Took an active part in wireless engineering up to 1912. Joined the scientific staff of the U.S. Bureau of Standards, 1912, and has since been closely associated with the radio work of the U.S. Government. Inventor of a direct reading decremeter and other devices, Fellow of the Institute of Radio Engineers. Attaché to American delegation representing the U.S. in London International Radio Convention in 1912. Member American Institute of Electrical Engineers. Member Cosmos Club, Washington, D.C. Address: U.S. Bureau of Standards, Washington, D.C.

Koomans, Nicolaas.—B. December 18th, 1879, at Delft. Studied at Delft for mechanical and electrotechnical engineer, obtaining his certificate, 1901. For one year assistant in applied geometry, and for one and a half years in physics and electrical engineering at the Technical High School at Delft. Entered the Government Telegraph Service. Graduated 1908 at the Technical High School at Delft as Doctor in Technical Sciences on the strength of a dissertation " Regarding the Influence of Self-Induction in Telephone Conducting Wires," containing theses in which are laid down the results of, and the conclusions from, experiments and measurements on Pupin cables of the Dutch telegraph administration. Joint-founder and editor of the *Monthly Review for Telephony and Telegraphy*. Joint-founder and member of the managing board of the Dutch Society for Radiotelegraphy (Nederlandsche Vereeniging voor Radiotelegrafie). Member of the International Electro-technical Commission. Professor in Physics and Theoretical Electrical Engineering at the school of the Dutch Post and Telegraph Administration. Supervises the instruction of all the higher officials. Address: Antonie Duyckstraat 24, The Hague, Holland.

Korn, Professor Arthur. Professor at the Polytechnical High School, Berlin-Charlottenburg.—B. Breslau, Germany, May 20th, 1870. Studied at Leipsig and Paris in Mathematics and Physics. Professor of Physics at the University of Munich, 1903-8. Best known as the inventor of a system of telegraphic transmission of photographs, and in 1907 the first photograph was transmitted under his system from Munich to Berlin, a distance of 600 kilometres. Inventor of a system of telautography. Author of " Elektrische Fernphotographie und Aehnliches," Leipzic, 1904, and " Handbuch der Phototelegraphie und Telautographie," published in 1911 in collaboration with Dr. Glatzel. Address: Charlottenburg, Berlin. Schlüterstrasse 25.

Koto, Major-General, Teizo, Military Engineer.—B. Yamaguchi prefecture, May, 1873. Entered the military service as cadet in the 6th Engineering Battalion, 1892, and promoted to 1st Lieutenant, May, 1898. Entered the Science College of the Tokyo Imperial University as a special student of the School of Artillery and Engineering, 1900, and graduated therefrom 1903. Served in the Russo-Japanese war as the chief of the Field Telegraphy Corps, 1904. Promoted Major and appointed an inspector of the Military Technical Dept., 1905. Promoted Lieut.-Major and appointed member of the Military Wireless Investigation Committee, 1910. Proceeded to China for the erection of a radio station on Chinwangtao Island, 1912. Promoted Colonel and Chief of the Communications Dept. of the Tsingtau Garrison, 1915. Engaged in the erection of radio stations at Hankow and Tsinan. Promoted Major-General and Military Engineer, 1919.

Kroger, F. H.—Educ. University of Colorado. Graduated M.S. 1905. Apprenticed to the Westinghouse Electric and Manufacturing Co., East Pittsburg, 1905. Engineer at Brant Rock Transatlantic Station of the National Electric Signalling Co., 1906. Radiotelegraph Adviser to the States Signal Corps, (1907) which installed the Inland Radio Station in Alaska. Organised educational courses in electrical engineering and in radiotelegraphy at Cornell University 1908-11. Joined the International Radiotelegraph Company, New York, 1911. Joined the Marconi Wireless Telegraph Company of America 1919 as division engineer at their factory. Address: 54, Martense Street, Brooklyn, New York.

Kujirai, Tsunetaro, Professor of the Tokio Imperial University. B. 1882. Graduated Electrical College of Tokio Imperial University, 1907. Sometime Wireless Engineer in the Department of Communications, and Assistant Professor of the Tokio Imperial University. Awarded the Academy prize and medal of the Japanese Imperial Academy. Member of the Institute of Physical and Chemical Research. Address: Tokio Imperial University, Hongo, Tokio, Japan.

L

Langmuir, Dr. Irving, M.A., Ph.D. of University of Gottingen (1906).—B. Brooklyn, New York, January 31st, 1881. Educ. School of Mines, Columbia University; graduated 1903 as metallurgical engineer. Undertook post-graduate work at University of Gottingen under Professor Nernst; returned to America and became Instructor in Chemistry at the Stevens Institute of Technology, 1906-1909. Entered Research Laboratory of G.E.C. at Schenectady, 1909, where his investigations have included Radio Telephone and Telegraphic Apparatus, Tungsten Lamps, Electric Heating Devices, Pure Electron Discharge Apparatus, etc. During the war engaged on submarine problem and developed several successful detecting devices used by the United States Navy. Has been a frequent contributor to various scientific journals and published many scientific works. Address: G.E.C. Research Laboratory, Schenectady, New York. 6, Stratford Road, Schenectady, New York.

Latour, Marius.—B. October, 1875, in South-Western District of France. Educ. University of Paris and Parisian Ecole Supérieure d'Electricité. For many years Consulting Engineer to the General Electric Company of America. Author of numerous inventions in the world of electro-dynamics. Paid special attention to the construction of high frequency machines, which he originally attempted to design in the shape of monophase or polyphase machines grouped in cascade. Analysed the essential features of machines based on this principle, and showed their analogy and close relationship to those of Professor Goldschmidt. Presented an original paper to the Technical Manager of the General Electric Company at Schenectady, 1904, setting forth the principle of the reception of continuous waves by beats, and this principle of beat reception is to-day in general use. Has specialised in the direction of constructing amplifiers of low and high frequency for wireless telegraphic reception, for the benefit of the French Société Radio-Electrique, of which he is consulting engineer. Address: 53 Rue Molitor, Paris, XVIe.

Litstrom, Axle Sigurd.—B. Falum, Kopparberg, Sweden, September 3rd, 1881. Passed Mautority Examination, 1900. In the service of the Government since 1901. Inspector of wireless installations, 1913.

Ljungqvist, Seth.—B. Falun, Dalecarlia, Sweden, May 5th, 1880. Passed Mautority Examination, 1899 and the examination of the Electro-Technical Branch of the Technical University, 1904; entered the Telegraph Service, 1899. Chief of the Radio Office in the Telegraph Department at Stockholm, 1916. Address: Vonadisvagon 23, Stockholm.

Lodge, Sir Oliver, D.Sc., F.R.S. B. Penkhall, Staffs, June 12th, 1851. Educ. at Newport (Salop) Grammar School; studied privately for several years. Entered University College, London, 1873. Graduated D.Sc. 1878. Reader in natural philosophy

at Bedford College for Women, and Assistant Professor of Physics in University College, London, for several years, then Professor of Physics in University College, Liverpool, for nineteen years. The First Principal of Birmingham University 1900. Knighted 1902. Original investigations on lightning, the seat of the electromotive force in the voltaic cell, the phenomena of electroylsis and the speed of the ion, the motion of the ether near the earth, and electromagnetic waves and wireless telegraphy. His patent for syntonic wireless telegraphy acquired by the Marconi Co. Has held the position of President of the British Association, President of the Physical Society, and of the Society for Psychical Research. Has made many important contributions to the literature of science. Address: Mariemount, Edgbaston, Birmingham.

Lombardi, Dr. Luigi, Professor of Electricity, Royal Polytechnic School, Naples, since 1901. B. August 21st, 1867, Dronero (Italy). Diploma of Civil Engineering, Royal Engineering School, Turin, 1894; Diploma in Electricity and Gori-Feroni prize, Industrial Museum, Turin, 1891; Professor of Electricity, Zurich Polytechnic School (1891–1896), at Industrial Museum, Turin (1897–1900). Publications: The "Scientific Principles of Electricity" and a textbook on Electrotechnics, besides numerous papers on kindred subjects. Author of a study on employment of condensers for transmission of electricity, which obtained Kramer Prize of Lombard Institute. Inventor of a special high tension electrical condenser. Now engaged in research upon electric surges and protective devices. For this purpose the first artificial Line for very high tension has been erected in his laboratory. Delegate of the Italian Government at the St. Louis International Congress of Electricity; President of the International Electrotechnical Commission held in Turin in 1911. Address: Via Santa Lucia 173, Naples.

Loring, Commander F. G., R.N., M.I.E.E.—Inspector of Wireless Telegraphy, General Post Office. Entered the Navy in 1882 (retired 1910). Lieutenant on H.M.S. "Victoria" when that vessel was rammed and sunk by H.M.S. "Camperdown" off Tripoli (1893). Received Bronze Medal of Royal Humane Society for saving two lives. In charge of Admiralty shore wireless stations 1902–8. Chief delegate for Admiralty at Berlin International Conference on Wireless Telegraphy, 1906. Appointed Inspector of Wireless Telegraphy, 1908. Represented the Post Office at International Conference on Wireless Telegraphy, London, 1912. Technical Adviser to the Board of Trade on Wireless matters at International Conference on Safety of Life at Sea, London, 1914.

Lyons, Colonel Henry George, D.Sc., F.R.S.—B. October 11th, 1864. Educ. Wellington College. Director-General of the Survey Department in Egypt 1898–1909, gaining Victoria Research Medal, R. Geog. Soc., 1911. Member of the Meteorological Committee 1913. European War, Commandant Army Meteorological Services; Acting Director Meteorological Office 1918–1919. Keeper, Science Museum, 3, Cambridge Square, W. 2.

M

Machado, Alvaro de Melo, First Lieutenant in Portuguese Navy, and Torpedo Operating Officer of the Naval College of Val de Zebro. B. February 22nd, 1883. Entered Portuguese Naval Service, 1904, and elected Member of the Portuguese Academy of Science for his original design of wireless-controlled torpedo in 1907. In 1915, whilst only Second Lieutenant, became Manager of the Electrical Services of the Marine Arsenal, and was responsible for the direction of the installations made in the National Naval Units and Land Stations of the Navy. Reorganised the dismantled wireless on German vessels confiscated during the war. Received Portuguese Distinguished Service Medal, and made Member of the "Académie Française" in 1917, in acknowledgment of his wireless work. Address: Ministry of Commerce, Lisbon.

Madge, Henry Ashley, B.A., M.I.E.E.—Expert in Wireless Telegraphy to the British Admiralty

since 1905. B. February, 1879. Peterhouse, Cambridge, 1898-1902. Junior engineer to the Marconi Company for a time. Address: Priory Cottage, Hollybank, near Emsworth, Hants.

Makower, A. J.—B. May 9th, 1876. Chairman of the Board of Examiners in Electrical Engineering. Educ. University College School, Gower Street, and at the College itself, between 1884 and 1895. Studied mathematics at Trinity College, Cambridge, taking his degree, 1898. Proceeded to Technical School Charlottenburg, Germany, and obtained valuable insight into German methods. Joined the British Thomson-Houston Company, Rugby. Received an appointment at the South-Western Polytechnic, Chelsea, 1904. As head of the Electrical Engineering Department at the Polytechnic, was closely connected with the University of London, of which he was a teacher. At one time Secretary of the Board of Studies in Electrical Engineering. Author of many valuable papers on wireless subjects. Resigned his teaching post and became managing director of Mossay & Co., Ltd., designers and selling agents for commercial electric vehicles, 1918. A member of the Electric Vehicle Committee of Great Britain. Address: 12, Greencroft Gardens, N.W.6.

Makower, Capt. W., M.A., D.Sc.—B. Dec. 6th, 1879. Educ. University College School and University College, London. Took honours degree in Chemistry at the University of London, 1900. His early research work relates to investigations in heat, but on proceeding to Trinity College, Cambridge, 1902, commenced investigations at the Cavendish Laboratory on radioactivity. Elected to a Research Fellowship in the University of Manchester. Subsequently Assistant Director of the Physical Laboratories. Continued these researches until 1917. Joined the R.N.V.R. as a lieutenant, 1917, and subsequently became captain in the R.A.F. During the war, at the Air Ministry Laboratory in the Imperial College of Science and Technology, working on thermionic valves and other matters connected with wireless telegraphy. Since the armistice has been engaged on various problems connected with wireless telegraphy and navigation being investigated at the Air Ministry Laboratory.

Most of his scientific publications have been in connection with radioactivity, of which, perhaps, the most important are on the subject of radioactive recoil, which he discovered with Dr. S. Russ in 1909, and he was awarded the degree of D.Sc. at London as a result of his early investigations in this subject. Of his other contributions to Science are his work on the Electric State of the Upper Atmosphere and his books on *Radio-active Substances* and *Practical Measurements in Radioactivity*. Elected a Fellow of University College, London, 1912, and for some years past has acted as Recorder of Section "A" of the British Association.

Marchant, Edgar Walford, D.Sc., M.I.E.E.—David Jardine Professor of Electrical Engineering in the University of Liverpool. B. Kent 1876. Educ. University School, Hastings, and Central Technical College. Graduated B.Sc. at London University with honours in physics and mathematics, and subsequently took the degree of D.Sc. After serving an apprenticeship appointed Superintendent of Lord Blythswood's Laboratory and Workshops at Renfrew, N.B., 1897, where he carried out many experiments in wireless telegraphy. Leaving Renfrew in 1900 served as chief assistant for one year at the Finsbury Technical College under the late Professor Silvanus P. Thompson. Lecturer in electro-technics at University College, Liverpool, 1901, and on the establishment of a Chair of Electrical Engineering in 1903 was elected the first professor. Closely associated with the late Mr. Duddell in the development of the oscillograph and joint author of a paper read before the Institution of Electrical Engineers on the study of the electric arc by the aid of oscillographs. Author of a number of articles on wireless and cognate subjects, and was one of the British delegates to the Scientific

Commission on Wireless Telegraphy, held in Brussels, April, 1914. Vice-President of the Wireless Society of London, Past President of the Liverpool Engineering Society, Past Chairman of the Manchester Section of the Institution of Electrical Engineers, Member of the Council of the Institution of Electrical Engineers. Address: 2, Ivanhoe Road, Sefton Road, Liverpool.

Marchant, W. H.—B. London, March 22nd, 1881. Commenced experimental work in connection with W/T (1904). From 1906–1911 he served with De Forest Syndicate, Poulsen Company, and Lepel and Anglo-German W/T Companies, being chiefly engaged in experimental work. Since 1911 he has devoted himself mainly to literary work and to teaching. Address: "Thornlea," Wilmslow, Cheshire.

Marconi, Alfonso.—B. Bologna, 1865. Educ. Bedford Grammar School, England, and Technical Colleges in Florence and Leghorn. Assisted his brother in carrying out his first experiments in Wireless Telegraphy on one of his father's estates near Bologna. Joined the board of Marconi's Wireless Telegraph Company and the Marconi International Marine Communication Co., Ltd., July, 1909.

Marconi, Senatore Guglielmo, G.C.V.O., LL.D., D.Sc., M.I.E.E.—B. Bologna, Italy, April 25th, 1874; he is Irish on his mother's side. Educ. Leghorn and Bologna. First interested himself in the problem of wireless telegraphy, 1895. Visited England, 1896, and took out the first patent ever granted for a practical system of wireless telegraphy by the use of electric waves. Earliest experiments in England made at Westbourne Park. Shortly afterwards Mr. Marconi saw Sir W. H. Preece, and at his request made some experiments for him and the Post Office officials. Some further experiments were made in May, 1897, in the Bristol Channel, wireless communication being established between Lavernock and Brean Down, a distance of nine miles. On the invitation of the Italian Government, Mr. Marconi subsequently went to Spezia, where a land station was erected, which was kept in constant communication with two Italian battleships working from a distance of twelve miles. The Italian Government conferred upon Mr. Marconi the honour of knighthood, and his system is now used extensively in Italy. On his return to England further experiments were conducted between Salisbury and Bath, a distance of thirty-four miles. On July 20th, 1897, the Wireless Telegraph and Signal Co., Ltd.—now known as Marconi's Wireless Telegraph Co., Ltd.—was established, and two permanent stations were put up. In July, 1898, the Dublin *Express* gave day by day a wireless telegraphic report of the yacht races during Kingstown Regatta week, and proved the usefulness and facility with which the system can be applied to commercial purposes. Later Mr. Marconi established communication between Queen Victoria's residence at Osborne House, Isle of Wight, and the Royal yacht *Osborne* and her late Majesty was kept apprised of the progress made by the then Prince of Wales during the process of recovery from a serious accident. In December, 1898, Mr. Marconi installed apparatus to provide communication between the South Foreland lighthouse and a lightship on the South Coast. Mr. Marconi read a paper on "Wireless Telegraphy" before the Institution of Electrical Engineers in 1899. Early in 1901 telegraphic communication was established between two points more than 250 miles distant, and at the end of that year Mr. Marconi transmitted signals from Poldhu, in Cornwall, to St. John's, Newfoundland. In February, 1902, he received on board the s.s. *Philadelphia*, in the presence of the officers, good messages on the tape when at a distance of over 1,500 miles from the transmitting station, and signals at over 2,000 miles. In December, 1902, the station established at Cape Breton, Nova Scotia, under a contract with the Canadian Government, for transatlantic wireless telegraphy, was put into communication with the Cornwall station at Poldhu, and inaugural messages were transmitted to H.M.

the King of England, H.M. the King of Italy, and others, and to *The Times* newspaper. In October, 1903, during the voyage of the R.M.S. *Lucania* Mr. Marconi established communication between this ship and the Marconi stations at Glace Bay, Canada, and Poldhu, Cornwall, England, and a bulletin was published and issued daily to each passenger. A powerful station at Clifden, on the West Coast of Ireland, was opened early in 1907, for the establishment of commercial communication with the American continent (Glace Bay). Mr. Marconi's work has been recognised by many governments and seats of learning; he has been decorated by the King of Italy and the late ex-Czar of Russia, is an honorary doctor of many universities, including Oxford, Glasgow, Aberdeen, Liverpool, and Pennsylvania, besides having received the freedom of the principal Italian cities. In 1909 (in conjunction with Professor Braun) he was accorded what is perhaps the highest distinction that can be obtained by any scientist—the Nobel Prize for Physics. In 1914 he was elected a senator in the Italian Parliament, being formally introduced to the Assembly on March 27th, 1915. On July 24th, 1914, the King bestowed upon him the Honorary Knighthood of the Grand Cross of the Victorian Order. He also holds many scientific awards granted by various societies and institutions, of which we may quote as a comparatively recent instance his presentation by the Royal Society of Arts, on April 12th, 1915, of their Albert Medal, annually granted for distinguished services to science. Immediately on the declaration of war by Italy, Senatore Marconi placed his services at the disposal of King Victor, and was given the rank of Lientenant in the Italian Army. He has been employed on important military missions to England by the Italian Government, and on July 29th, 1916, was promoted Captain "for exceptional services." At the beginning of September in the same year he was transferred from the Italian Engineer Service to be temporary Commander in the Navy. Senatore Marconi visited the United States, 1917, as Member of the Official Mission sent by Italy to the U.S.A. Government. The world-famous University of Columbia invested their distinguished visitor with the honorary degree of Doctor of Science on June 6th, 1917. The Franklin Institute of Philadelphia conferred their Franklin Gold Medal upon Senatore Marconi on May 15th, 1918, for his services to humanity. One June 26th, 1919, Senatore Marconi was appointed by H.M. the King of Italy Plenipotentiary Delegate to the Peace Conference at Paris and in this capacity signed the Peace Treaties with Austria and Bulgaria. At the end of 1919 Senatore Marconi was awarded the Italian Military Cross. In addition to being Chairman of the Board of Directors of the Marconi Company, Senatore Marconi is Chairman of the Banca Italiana di Sconto and of the Lloyd Sabaudo Steamship Company.

Marriott, Robert Henry, Expert in Radiotelegraphy, U.S. Navy. B. 1879. First experimented with wireless telegraphy in 1899, while student at the Ohio State University, U.S.A. Employed by the American Wireless Telephone and Telegraph Company, Philadelphia, 1901, for which Company he erected stations at Breille, Galilee and Barnegat, N.J. Chief Engineer of the Pacific and Continental Wireless Telephone and Telegraph Company. Installed three stations in California, at Avalon, Santa Catalina Island, and San Pedro, 1902. Employed with the Carstarphen Electric Company at Denver, Colorado, 1903. Constructed stations for the American De Forest Wireless Telegraph Company, and its successor, the United Wireless Telegraph Company, in Colorado, Wyoming, and Texas, 1905. In charge of this Company's construction and maintenance, 1910. Entered Marconi Wireless Telegraph Company of America, 1911. Entered the U.S. Government service as Radio Inspector, 1912. Chairman, 1916, Seattle Section Institute of Radio Engineers. Member of the Committee on Standardisation. Fellow and Past-President The Wireless Institute, 1909-1912.

Marvá, General J., B. 1846. Practically the pioneer of Wireless Telegraphy in the Spanish Army. Founder of first Spanish Aerodrome at Cuatro Vientos. Author of many scientific works (*Mecánica aplicada a las construcciones, Tracción en Vías férreas, etc.*) Member, Royal Academy of Sciences, and International Association for experiments of materials.

McLachlan, Norman W., D.Sc. (Eng.), M.I.E.E.—Associate of the Heriot-Watt College and a D.Sc. (Engineering) of the University of London. Author of a text-book on " Practical Mathematics," and many papers in the *Journal of the Institution of Electrical Engineers* and other scientific journals. Engineer in service of Marconi Company. B. Longtown, Cumberland, 1888. Educ. Carlisle Grammar School and the George Watson and the Heriot-Watt Colleges, Edinburgh. Served apprenticeship with Messrs. Bruce, Peebles and Co. In 1909 was appointed Lecturer in Engineering and Mathematics at Newcastle-on-Tyne. In 1913 Superintendent of a branch technical institute, and Supervisor of Classes in Engineering Subjects in the Liverpool branch technical institutes. During the war carried out much research work for Government in aeronautics and anti-submarine devices, organising a laboratory at Air Ministry for research on liquid and gaseous oxygen apparatus for aircraft use. After the Armistice engaged in magneto research at the National Physical Laboratory, Teddington. Address: Marconi Research Laboratories, Hall Street, Chelmsford.

Meyer, Niels.—Director of Telegraphs to Danish Govt. since 1897. B. Rendsburg, Holstein, 1856. Educ. Polytechnic Academy, Copenhagen. Entered as a cand. polyt. 1878, and during same year became asst. in building department of Royal Dockyard. State Railway traffic learner (1880); telegraph engineer attached to the State Railways in Jutland and Funen (1882). Holds several Danish Orders and number of foreign decorations. Address: Sigridsvej 4 Hellerup, Copenhagen.

Minohara, Dr., Lieut.-Com. (of Ordnance), Tsutomu, Professor at the Naval Academy.—Graduated from the Tokyo Imperial University, 1907. Entered Naval Arsenals of Maizuru and Kure and engaged in the manufacture of electrical arms and equipment of radiotelegraphy. Member of the Wireless Research Laboratory in the Electrical Dept. of the Arsenal, 1912. Proceeded to France and Germany to study, 1914. Ordered home in consequence of the outbreak of the European war and resumed service at the wireless laboratory. Inspector of post-bellum condition of radiotelegraphy amongst the Allied Powers, 1917. Returned to Japan, 1918, and assumed service at the wireless laboratory again. Now engaged in the equipment of radiotelegraphy aboard war vessels and merchantmen and construction of high-power land stations. Appointed to serve in the Dept. of Communications, 1919.

Monckton, C. C. F.—B. Great Malvern, May 8th, 1867. Educ. at Uppingham and Malvern Colleges, and at the Central Institution of the City Guilds. Employed by the Brush Electrical Engineering Company, from whom he passed to Messrs. Boustead Brothers, of Ceylon. Filled Government appointments of Jamaica and Trinidad. Superintendent of Telegraphs and Telephones to the Government of Fiji, 1911. Censor of telegrams during the war. Superintended the erection of the first Colonial Wireless Stations in the West Indies, 1904. Author " Radiotelegraphy " (1907). Acts in an advisory capacity to the High Commissioner for the Western Pacific with regard to all matters relating to wireless in the territories under that official's jurisdiction. Address: Suva, Fiji Islands.

N

Nally, Edward Julian, President and Director, Radio Corporation of America and Pan-American Wireless Telegraph and Telephone Company. B. in Philadelphia April 11th, 1859, son of P. and Mary (Cullen) Nally. Public school education. Married Lee Warren Redd, of Lexington, Kentucky, June 10th, 1897; children Marylee and Edward Julian. Pioneer in different modes of communication

in America. Started as a messenger boy for Western Union Telegraph Company, in St. Louis; later chief clerk to Superintendent, Minneapolis, Minnesota; appointed assistant general superintendent Postal Telegraph-Cable Company, Chicago, 1890. He served this company for more than twenty years, being elected first vice-president and general manager, and director, New York, April, 1907. Left service of Postal Telegraph-Cable Company, 1913, to accept the position of vice-president and general manager of the Marconi Wireless Telegraph Company of America, which he organised for commercial service, and in 1914 opened a commercial wireless circuit between the U.S.A. and Hawaii, which in 1916 was extended to Japan. Clubs Caxton, Brothers of the Book, Lawyers, Pennsylvania Society, American Irish Historical Society, American Geographical Society, National Geographic Society, Ends of the Earth. Residence: The Trees, Ossining, N.Y. Business address: Woolworth Building, New York.

Norman, Major the Rt. Hon. Sir Henry, F.R.G.S., A.M.I.E.E., 1st Bt. cr. 1915, Kt. cr. 1906, M.P. (L.) Blackburn since 1910. Chairman of Committee (appointed Nov., 1919) to advise British Government on Imperial W/T Communications. B. Leicester, Sept. 19th, 1858. Educ. privately in France; Harvard University (B.A.); Leipzig University. Officer of Legion of Honour; Commander of Order of the Saviour; Officer of S.S. Maurice and Lazare. Assistant Postmaster-General 1910; Chairman War Office Committee on W/T (1912); member of Committee on National Telegraphic Research and P.O. Telegraph Organisation Committee; member of British Association Committee of Radiotelegraphic Investigation and of International Committee of Radiotelegraphic Research; Vice-President of Wireless Society of London; Fellow of Physical Society; Fellow of American Institute of Radio Engrs.; Liaison Officer with French Government for Military Inventions; Vice-Chairman Imperial Communications Committee, and Chairman of Wireless Sub-committee. Personally operated for the Admiralty during early days of war his private wireless station at Hindhead. Address: The Corner House, Cowley Street, S.W.1.

O

Orchiston, J., M.I.E.E.—Late Chief Engineer of Telegraphs, Wellington, New Zealand. B. Aberdeen, Scotland, 1857, and arrived in New Zealand with his parents, 1862. Joined the Telegraph Department as a cadet, January, 1874, and shortly afterwards was placed in charge of the Hawera office. After performing the duties appertaining to officer-in-charge and postmaster for three and a half years, he was transferred to the Technical Branch of the service. At the age of 21 he was Acting Sub-Inspector in charge of all construction works in the Wellington district. In August, 1880, promoted Sub-Inspector, and placed in charge of the Auckland telegraph district. In 1894 his designation was altered to that of Inspector, and he was transferred to the Otago district, being finally promoted to the position of Chief Engineer at Wellington in January, 1911. Retired on superannuation, 1918.

Orme, Major Robert, B.A. B. at Bray (Ireland), October 20th, 1865. Educ. in Irish schools and graduated B.A. at Trinity College, Dublin. Initiated career by taking up Electrical Engineering under Hugh E. Harrison at Hammond College, and then apprenticed to Anglo-American Brush Company. Since 1900 concentrated chiefly on wireless telegraphy and atmospheric electricity. Granted commission in R.F.C., January, 1915, organised and was given command of the Wireless School, Brooklands, November, 1915. Moved himself and his staff from Brooklands to Biggin Hill in September, 1916, where they were constituted first as the Wireless Testing Park and later as the Experimental Establishment, R.F.C. Address: Hollycroft, East End, Newbury, Berks.

P

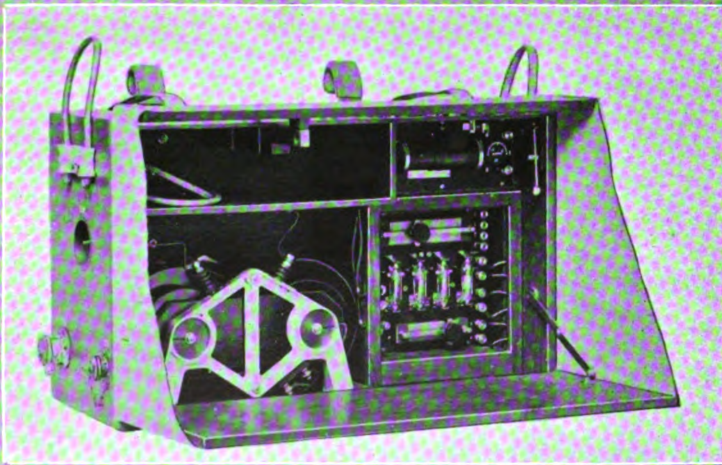
Page, Captain Powhatan, of the Argentine Navy, Director of the Wireless Telegraphic Department of

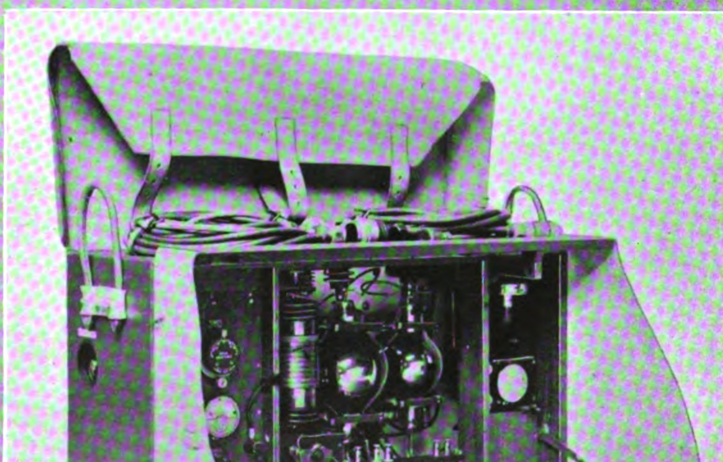
Argentina.—B. August 28th, 1875, in the Province of Entre-Rios, Argentina. Descendant of a distinguished Virginian family. Educ. at University College, Buenos Aires. Entered the State Naval College 1890. Obtained a naval commission as midshipman, 1894. Professor of High Explosives and Practical Gunnery for two years. Visited China and Japan as a staff officer. Director of Battle Practice on board the armoured cruiser "Belgrano," 1907. Member of the Naval Construction Commission in England, 1908 to 1909. Port Commander at the naval base of Bahia Blanca, 1914. Appointed to the High Command of Batteries and Coast Defence at Bahia Blanca, 1915. Chief of the Radiotelegraphic Division of the Navy, which controls all public wireless services ashore and afloat. Has carried out many experiments on long distance reception, and devised a special receiving installation.

Pannill, Charles Jackson. B. Petersburg, Va., May 13th, 1879. Entered Navy, 1898. Chief Telegraphist of United States Coast Signal Service. Entered service of Professor Reginald A. Fessenden, 1902. Conducted experiments in radio communication across Hampton Roads. Installed communication by radio between New York and Philadelphia, 1903. Installed first radio outfit on United States battleship. Conducted experiments between stations of General Electric Company, at Lynn and Schenectady, also between Brant Rock, Mass., and Machrihanish Bay, Scotland. Holds commercial first-grade licence No. 1. Entered service of United Wireless Telegraph Company as Division Superintendent, 1909. Erected shore radio stations on Great Lakes, later in charge of division south of New York. Entered service of Marconi Wireless Telegraph Company of America, 1912. Superintendent, Southern Division. Entered service of United States Government, 1914, as expert radio aid, Naval Radio Service. Promoted to Assistant to Director Naval Communications in charge of commercial radio service, 1917. Fellow of the Institute of Radio Engineers. Member Washington Society of Engineers. Member of the Geographical Society. Resident Member of Cosmos Club, Washington.

Parker, J. N.—Superintendent, Wireless Telegraph Stations, Indian Post and Telegraph Department. Son of the late Major-General N. F. Parker, of the Bengal Army. B. July 6th, 1881, in Calcutta. Educ. Clifton College and the Royal Indian Engineering College, Coopers Hill. Passed out of the latter institution (1902) with diploma of Associate. Joined Indian Government Telegraph Department. Appointed to Electrical Engineer's Office, Calcutta, January, 1904. Accompanied Mr. M. G. Simpson, then Electrical Engineer-in-Chief, to Burma, February, 1904, to assist in preliminary wireless experiments. Continued his connection with the Electrical Engineer's Office and the technical side of telegraph work, which included the erection of several of the 30-kw. Marconi stations belonging to the Department. Took over the duties of his present post October, 1914. Represented the Post and Telegraph Department at Poona in connection with the erection of the Imperial Chain Station, until work stopped early in 1915.

Pedersen, P. O., Professor at the Royal Technical College, Copenhagen. B. at Sig, near Varde, Jutland, 19th June, 1874. Entered Royal Tech. Coll., Copenhagen (1892). Cand. Polyt. (1897); Chief Eng. of Telegrafonen, Ltd. (Poulsen Patent), 1899-1902. Gold Medal Danish Society of Sciences (1907). Lecturer at the R. Tech. Coll., Copenhagen, and Professor from 1912. On board of Dansk Telegrafonfabrik (Danish Telegraphone Co., Ltd.), 1903-1912, as well as on Elektroteknisk Forening (Electrotechnic Association) from 1910; chairman from 1916. Director of Det Kontinentale Syndikat for Poulsen Radiotelegrafi (Continental Syndicate for Poulsen Radiotelegraphy) from 1911. Member of International Electrotechnical Commission. Fellow Inst. of Radio Engineers since 1915, and a Fellow of Royal Danish Academy of Science since 1917. Member of the Telephone Commission (1917), of the Control Committee of licensed Tele-





ABOVE—MARCONI Y.C.2 PORTABLE SET — RECEIVER (INCLUDING, ON LEFT-HAND SIDE, HIGH TENSION TRANSFORMER FOR SUPPLYING RECTIFYING VALVES OF TRANSMITTER).

BELOW—MARCONI Y.C.2 PORTABLE SET — TRANSMITTER.

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phone Companies, and of the Commission on the training of radio operators. His contributions to electro-technical literature have been both important and numerous. Amongst those of recent appearance we may enumerate the following :—" Om Poulsen Buens Teori " (Copenhagen, 1917) ; " On the Theory of the Poulsen Arc " (*Proc.* Inst. Rad. Eng , New York), 1917 and 1919 ; " Poulsen-Buens Virkemaade," *Fysisk Tidskrift*, Vol. xvii. (Copenhagen, 1918) ; " Den Elektriske Bues Elektronteori " (*Elektroteknikeren*, Copenhagen, 1917) ; " The Lichtenberg Figures " (Copenhagen, 1918) ; and " Townsend's Teori for Stoedionisation " (Copenhagen, 1918). Address: Amalievej 1, Copenhagen, V. Denmark.

Penido, Antonio Nogueira, Director, General of Brazilian Telegraphs (since 1918). B. 25th September, 1864, at Juiz de Fóra, Minas Geraes. Civil engineer of the " Escola Polytechnica " of Rio de Janeiro (diploma March, 1886). Was engaged in the construction of the Central Railway of Brazil ; the Recife-Caruarú Railway, the Sorocabana Railway ; port works of Rio de Janeiro and works at Saneamento of the town of Juiz de Fóra. Successively Engineer of Public Works of the State of São Paulo, Chief of Traffic of the Sorocabana Railway, Chief Engineer of the Itapura-Corumbá Railway, and Inspector-General of the Mogyana Railway.

Petavel, Sir Joseph Ernest, K.B.E., D.Sc., F.R.S., M.I.Mech.E., A.M.Inst. C.E., Director of the National Physical Laboratory, Teddington. B. 1873. Educ. University College, London. Scientific Research at the Royal Institution and at the Davy Faraday Laboratory, 1896-98. John Harling Fellow, Owens College, Manchester, 1900-3. Scientific Manager of the Low Temperature Exhibit of the British Royal Commission for the St. Louis Exhibition, 1904. Professor of Engineering and Director of the Whitworth Engineering Laboratories, University of Manchester, 1908-1919. Publications: Various papers in the Philosophical Transactions of the Royal Society, " The Philosophical Magazine," " Engineering," etc. Member of Advisory Committee for Aeronautics and various other Government Committees connected with Aviation. Member of Committee on Imperial Wireless Scheme. Clubs: Royal Automobile, Primrose Club, London ; Engineers' Club, Manchester. Address: National Physical Laboratory, Teddington, Middlesex.

Petersen, Hermod.—Inspector of Wireless Telegraphy, Norwegian Government Telegraph Department. B. Christiania, 1875. Graduated as electrical engineer at Bergen Technical College, afterwards attending the Polytechnic University at Karlsruhe, Baden. Chief of the Telegraph Schools, 1900-13. One of the pioneers of wireless telegraphic expansion in Norway. Superintended the first radio experiments, 1901. Later on formulated schemes for all wireless land stations along Norwegian coast. Member of the first International Conference on Wireless Telegraphy, Berlin, 1906. Engineer-in-Charge during the erection of a wireless station at Spitzbergen (1911), which communicates with a similar station in the north of Norway. Remained in charge during its first winter. Chief of the Norwegian Wireless Department, 1913. Superintends the land stations. Also Government Wireless Inspector, controlling all the ship stations of Norway. Published a number of technical books for instructional purposes, principally on the subject of telephony and telegraphy, both wired and wireless.

Petit, Gaston Emile.—Electrical Engineer in the French Postes et Télégraphes ; Technical Director of the Compagnie Générale de Radiotélégraphie. B., Paris, 1877. Chief of the Service of Wireless Telegraphy at the French Postes et Télégraphes, 1905-1911. Member of the International Conference on Wireless Telegraphy, Berlin, 1906.

Pickard, Greenleaf Whittier, A.A.A.S.—Electrical Engineer. B. Portland, Me., February 14th, 1877. Educ. Westbrook Seminary, Lawrence Scientific School, Harvard, and Mass. Institute of Technology. Has made a special study of wireless telegraphy and telephony, and has taken out many United States and foreign patents for

wireless inventions. Executed good pioneer work in radiotelephony, and still actively engaged in this branch of the science. Began radio work, 1890, at Blue Hill Observatory, Milton, Mass., under a grant from the Smithsonian Institution. Became associated with Harry Shoemaker, 1901. On the engineering staff of the American Telephone and Telegraph Company, 1902-06. Developed a practical system of radiotelephony, obtaining successful speech transmission without wires, 1902. From 1906 until the present date has been connected with the Wireless Specialty Apparatus Company as consulting engineer. Practises extensively as patent expert in wireless patent litigation. Consulting electrical engineer to the Huff Electrostatic Separator Company. Fellow of the American Institute of Electrical Engineers. Member of the American Chemical Society. Member of the Society of Chemical Industry. Member of the Institute of Radio Engineers. Club: Engineers'. Private address: Newton Centre, Mass. Office address: C and Fargo Streets, Boston, Mass.

Poulsen, Valdemar, Eng. D.Sc., D.Ph. (h.c.) Leipzig (1909). B. Copenhagen, Nov. 23rd, 1869. Studied at University of Copenhagen 1889–1893. Entered technical department Copenhagen Telephone Company 1893, and for number of years superintended electrical testing operations. Holds Medal for Merit in gold, with crown. Collaborated with Prof. P. O. Pedersen for many years. Member of the board of the Telegrafonen, Ltd. (Patent Poulsen), 1902–16. Joined board of Dansk Telegrafonfabrik, Ltd., 1909, and that of Poulsen Wireless Telephone and Telegraph Company, U.S.A. (1909–11). Fellow of Danish Society of Sciences (1914). Grand Prix at Paris in 1900 for telephone work. Initiated in 1903 a method of generating continuous electrical waves. Danish Society of Sciences' Gold Medal (1907). Publications: "Une Méthode pour Produire des Oscillations non Amortiés et leur Emploi dans la Télégraphie sans Fil"; and "La Téléphonie sans Fil: Rapport Officiel au Congrés International des Applications Electriques," Turin, Sept., 1911 (Copenhagen, 1912). Address: Gentofte Maltegaardsvej 6, Copenhagen.

Prince, Major Charles Edmond, O.B.E. Technical Manager of the Aircraft Department, Marconi's Wireless Telegraph Co., Ltd. B. Capetown 1874, son of Rev. E. B. Prince, sometime Vicar of Tor Mohun, Torquay. Educ. Clifton College (Science Exhibitioner) and Faraday House. Married in 1908 Amelie Ella Verner. Published 1905 "Ode on Poetry and other poems" (Harrison, Pall Mall), &c. Joined Marconi's Wireless Telegraph Co., Ltd., 1907, specialised in Research Work and particularly in Wireless Telephony. Demonstrated first Marconi Field Station in Italy and Switzerland, 1909. Instituted important improvements in Bellini-Tosi Direction Finding System. Granted commission in Westmorland and Cumberland Yeomanry, 1911. Attached R.F.C., April, 1915. Developed at Brooklands in same year first aircraft wireless telephone. Gazetted experimental officer (First Class), Dec. 1915. Mentioned in despatches 1918, and in the same year appointed Major. Granted M.B.E. 1918, O.B.E. (Military Division) 1919. Addresses: Stubbings Manor, Burchetts Green, Berks.; 63, Drayton Gardens, London, S.W.

Pupin, Dr. Michael L.—Director of Research Laboratory, Columbia University, U.S.A. President, Institute of Radio Engineers. B. Hungary, October 4th, 1858. Went to the United States 1874. Studied at Columbia University. Graduated 1883. Study continued at Cambridge, England, and Berlin. Returned to the United States. Professor of Mathematical Physics at the Columbia University, 1891. Among his first original work may be mentioned the development of electrical resonance, before the introduction of wireless telegraphy. Patents issued to him on electrical selectivity were licensed to Marconi's Wireless Telegraph Company, 1903. Has worked extensively in the development of his inventions in connection with telephones and telegraphs, and many of his improve-

ments are known by his name throughout the world. Has recently been engaged in the development of a new method of electrical selectivity to be used in connection with wireless telegraphy. Has also been engaged in research work in wireless telephony.

R

Rego, Capt. T. R. Moraes, Chief of Radiotelegraphic Service, Brazilian Navy. B. Rio de Janeiro, March 8th, 1882. Completed training at Naval Academy, 1900. Served for a few years on ships, studying electricity and torpedoes. Torpedo Lieutenant in the Professional Torpedo School. Began studying radiotelegraphy when first wireless stations were installed in Brazilian Navy, 1904. Perfected his knowledge of the subject on special trips to Europe and America. Assistant in the Radio Department of the Navy on various occasions. Appointed (1914) Chief of the Radio Service, a post which he still holds. Address: 22, Ipanemer Copacabana, Rio Janeiro.

Rendahl, R. H.—B. 1878. Electrical engineer in the Royal Swedish Navy Department, 1909; attached to the Swedish Board of Admiralty, 1912; wireless expert attached to the Swedish Navy. Knight of the "Nordstjaerna" Order, and holder of several foreign orders. Address: Djursholms, Ösby, Sweden.

Reoch, Alexander, Wireless engineer, American Marconi Company. B. Sheffield, England, 1884. Educ. Sheffield Science School and Sheffield University College. Graduated in electrical engineering, 1902, winning the Mappin Medal and Prize in that year. Entered the service of the English Marconi Company in June, 1902, and undertook construction and operating work for that company in England, Holland, Germany, and Egypt. Appointed engineer with the Canadian Marconi Company, 1905. From 1909 to 1911 temporarily in complete charge of the business of the Canadian Marconi Company, during which time that company's contract with the Canadian Government for the operation of the Great Lakes stations was negotiated, as well as the contract between the Canadian Company and the Newfoundland Government. Chief engineer of the Canadian Marconi Company, 1917, and at the beginning of 1918 he relinquished this position to take an appointment on the engineering staff of the American Marconi Company. Address: 233, Broadway, New York.

Ribeiro, Alvaro Nunes, Commander and Director, Radiotelegraphic Station of Monsanto. B. Lisbon, 1879. Educ. National Lyceum and the Lisbon Polytechnic School. Cadet in the Naval School, 1898. Completing his training there, was commissioned to join an expeditionary force to the Zambesi. On his return to Portugal he was appointed naval instructor at the Torpedo and Electrical School, where he devoted himself to the study of wireless. Leading member of the Naval Commission on Organisation, 1910, where he strongly advocated the establishment of a naval staff for war purposes. Member of Parliament. Member of the Commission on Posts and Telegraphs. Secretary to the Naval Commission. As a member of the Posts and Telegraphs Commission he fathered a Bill for the organisation of Portuguese Colonial Wireless, and as soon as the Act had been passed by Parliament a contract to carry out its provisions was concluded with the Marconi Company. Commanded the vessels "Berrio" and "Patrao Lopez" engaged in rescue work, when he met with a serious accident trying to save a cruiser. As a consequence returned to shore service, where he organised the Portuguese Coast Service, and formulated a code of regulations. Address: R. Vieira da Silva 64, Lisbon.

Righi, Professor Augusto.—B. Bologna, 1850. Educ. at the University there. Professor of Physics, 1873-80, Bologna Technical Institute; at Palermo University, 1880-85; at the Padua University, 1885-89; at the Bologna University since 1890. From 1872 to 1918 he published 234 original papers in scientific periodicals, many of which have been translated into French, English, German, Russian. Also published several books. Author of many papers. Represented the

Italian Government as Plenipotentiary at the International Time Congress of Paris, 1912-1913. Representative of the same Government at the International Congress of Radiology and Electricity in Brussels, 1910.

Rinde, K. Werner J., son.—B. Falun, 1882. Educ. Falun and Göteborg University. Telegraph clerk, controller, etc. Studied W/T and telephony systems and traffic, during voyages to Holland, Great Britain, Germany, Austria, Italy, and U.S.A. 1912–13 (autumn 1912 for some months with the Marconi companies in Rotterdam and at sea). Teacher at W/T school of Royal Swedish Telegraph Board from 1914. Supt. of the W/T station at Vaxholm, Sweden, 1914–1916, of Karlsborg Radio since beginning of 1917. Address: Karlsborg, Sweden.

Robinson, James, M.Sc. (Dunelm), Ph.D. (Göttingen). B. September 9th, 1884, son of Robt. Robinson, of Seghill, Northumberland. Educ. Higher Grade School, Blyth, Armstrong College, University of Durham, University of Göttingen (1907-1909). Studied Mathematics and Physics at Armstrong College, and Mathematics and Physics and Electrical Engineering at University of Göttingen. Pemberton Fellow of Armstrong College, Univ. of Durham from 1906-1909. Publications (Physics): Dust Figures in Kundt's Tube (papers in *Physikalische Zeitschrift*, *Philosophical Magazine*, *Proceedings* of the Physical Society of London, between the years 1908 and 1913). Absorption of Cathode Rays in Gases (papers in *Annalen der Physik*, *Proceedings* of the Philosophical Society of the University of Durham, in 1910). Photoelectric effect (papers in the *Philosophical Magazine*, 1910-1915). Appointments —Armstrong College, Demonstrator in Physics, 1906-07; Lecturer in Mathematics, 1909-10. University of Sheffield, Lecturer and Demonstrator in Physics, 1910-12. East London College, University of London, Lecturer in Physics, 1912-15. Examiner in Physics, University of London, 1912-15. Wireless experience:—Commenced in 1915 in the R.N.V.R. as Lieut., R.N.V.R. In 1917 attached R.N.A.S. for experimental W/T work. Wireless publications: "Directional Reception on Aircraft" (read at Brit. Ass. in 1919, see abstract in *Radio Review*, Oct., 1919); "Elimination of Magneto Disturbance on Aircraft" (*Radio Review*, Dec., 1919); Various patents, only two published so far, 8736/18 and 18077/18.

Robison, Samuel S., Rear-Admiral U.S. Navy. Member of the Institute of Radio Engineers. B. May 10th, 1867. Graduated from the U.S. Naval Academy, 1888. In personal charge of the Division of Radiotelegraphy in the Bureau of Equipment, Navy Department, 1904-1906, and in general charge from 1909-1911. Author of the "Manual of Wireless Telegraphy for Naval Electricians," first issued in 1906, and revised for several subsequent editions. Address: Boston Navy Yard, Boston, U.S.A.

Rodrigues, Apolinio Gomes da Silva, Flag Captain in the Portuguese Navy. B. May 31st, 1866. Finished education and entered Portuguese Navy in 1886. Became Professor of Electricity and Torpedoes at the Naval College in 1902, and Professor of Electricity of Naval Auxiliary College 1903. Received his present rank of Flag Captain in 1907. Entrusted with embodiment of Naval Regulations concerning wireless in 1909. Elected Member of Advisory Committee on wireless in the Portuguese Navy in 1910. Address: Portuguese Admiralty, Lisbon.

Rydin, Sven Ludvig Herman.—Since 1905 Director of Telegraphs in Sweden. B. Upsala, October 2nd, 1861. Graduated in law, Upsala 1885, solicitor's clerk 1887, Registrar in the Lower House 1888-90, Registrar in the Upper House 1890-97, Auditor attached to the Swedish State Railways 1890-97, Registrar attached to the Board of the State Railways 1895-96, assistant to the Director of the State Railways 1896-97, Secretary to the Board of Telegraphs 1897-1900, Under-Secretary of State for Home Affairs 1902. Commander of the "Nordstjaerna" Order and holder of several foreign decorations. Address: Kungl. Telegrafstyrelsen, Stockholm.

S

Saltzman, Charles McKinley, Brigadier-General, Executive Officer in the Chief Signalling Office. B. 1871, State of Iowa. Started business as railway telegraphist and graduated at West Point, 1896. As cavalry officer took part in the Spanish-American War, 1898. Signal officer during the Insurrection in the Philippine Islands. Transferred to the Signal Corps of the U.S. Army, 1901. Since identified with the electrical, cable and radio work, U.S. Army. For a number of years in charge of the Electrical Laboratory of the Signal Corps in Washington, where radio equipment of the U.S. Army is designed and tested. In charge of the radio work of the U.S. Army on the Panama Canal. Represented the United States at the International Radiotelegraphic Conference of London, 1912. Member of the Inter-Departmental Board which prepared regulations for the control of radiotelegraphy in the U.S.A. Address: Executive Officer in Chief Signalling Office, Bureau of Navigation, Washington, D.C.

Sankey, Captain M. P. H. Riall, C.B., R.E. (ret.). B. Nenagh, Ireland, 1853. Educ. Switzerland, Royal Military Academy, Woolwich, School of Military Engineering, Chatham. Served in England, at Gibraltar, and as Instructor in Fortification at the Royal Military College, Kingston, Canada. Posted to the British Ordnance Survey, and had charge of the Trigonometrical Division, the Electrotyping Department and the Workshops. Retired from the service (1889) to join the Board of Messrs. Willans and Robinson, Ltd., and in 1904 he took up consulting work. Shortly afterwards he joined the Boards of the Marconi Wireless Telegraph Company, Limited, and of the Marconi International Marine Communication Company, Limited. He is an accepted authority on thermo-dynamic problems. Member of the following institutions: Civil Engineers, Mechanical Engineers, American Mechanical Engineers, Electrical Engineers, Iron and Steel, Naval Architects, and Gas Engineers. Member of the Governing Board of the National Physical Laboratory and of the Wireless Telegraphy and Gaseous Explosives Committees of the British Association. Appointed for the duration of the European war Hon. Engineering Advisor to the Director of Fortifications and Works. Served on the Hon. Valuation Advisory Committee of Experts, dealing with the plant and buildings installed by manufacturing firms for munition purposes. Address: 57, Castle Bar Road, Ealing, W.5.

Sarnoff, David.—B. in Russia, February, 1891. Entered the United States July, 1900. Started business 1906, and in 1907 received an appointment as Wireless Operator at the Marconi Station located at Siasconset, Nantucket Island, Mass Served at various Ship and Shore Stations, and eventually became Manager at the Marconi Station at Sea Gate. Has held a number of responsible positions in the service of the Marconi Wireless Telegraph Company of America, being now Commercial Manager. Vice-Pres. and Director of the Pan-American Wireless Telegraph and Telephone Company. Secretary of the Institute of Radio Engineers for 1915-1916-1917. Author of a paper on Radio Traffic read before the Institute of Radio Engineers, and a number of other papers on wireless telegraphy. Addresses: 90, Pinehurst Avenue, and 233, Broadway, New York.

Sayeki, Mitsuru, Chief Radio Engineer Installation and Inspection Section of the Direction General of Posts and Telegraphs since 1908 B. Japan, 1871. Entered Naval College, 1889. Entered the Electric Technical Laboratory, in the Ministry of Communications, 1895, and has been engaged in the investigation of radiotelegraphy since 1899. The greater part of the "Teishinsho" Radio System was invented and designed by him. All the Government and private commercial coast stations were designed and erected by him. Nearly all the commercial ship stations in Japan are using the apparatus designed by him. Received prizes and medals for his investigations in radiotelegraphy.

Schledermann, Helmuth Joh. Christian, Electrical Engineer in Chief to the Torpedo and Mining Dept., Danish Royal Navy. Knight Dannebrog (1912). B. Copenhagen, Sept. 24th, 1876. Educ. Royal Naval Engineering College; Polytechnic Academy of Copenhagen. Further training with electrical firms in foreign countries. Controls the Electrical and Wireless services of the Danish Navy, also Inspector of Danish W/T stations and Electrical and W/T adviser to the Danish Lighthouse Department. Member of the Danish Engineers' Assn., the International Electro-Technical Commission and a Commission dealing with education of Danish wireless operators. Publication: A manual on W/T for the Danish Royal Navy. Address: Taffelbays Alle 11, Hellerup, Denmark.

Schwill, Fr., Sub-Director of the International Bureau of the Telegraphic Union at Berne. B. Strasburg (in Alsace), April 21st, 1875. Started career as Member of the German Post and Telegraph Service. Took part in the International Radiotelegraphic Conference at Berlin in 1906, at the close of which he was appointed by the Swiss Federal Government to the International Bureau of the Telegraphic Union to organise and supervise the new Radiotelegraphic Section established by the Berlin Conference. Address: Bureau International de L'Union Télégraphique, Berne.

Shaw, Sir William Napier.—B. March 4th, 1854. Educ. King Edward's School, Birmingham; Emmanuel College, Cambridge, and Berlin University. Lecturer in the University of Cambridge; demonstrator and subsequently assistant director, Cavendish Laboratory. Member of the Meteorological Council 1897, Director 1905 to present day. Publications: Author of text-book of practical physics (conjointly with Sir Richard Glazebrook). Has written on air currents and laws of ventilation, besides a number of other papers on meteorology and electrolysis. Address: 10, Moreton Gardens, Old Brompton Road, S.W.5.

Simpson, Lt.-Col. Adrian, F.R.S., C.M.G., A.M.I.E.E., (late) R.E.—Son of Surgeon-General Sir Benjamin Simpson, K.C.I.E. B. Edinburgh, 1880. Educ. in his native city, and at Clifton and the Royal Military College, Sandhurst. Commissioned in His Majesty's Forces, 1900. Served in India, being transferred to the regular Indian Army. Visited Russia 1903-5 for linguistic study. Becoming interested in wireless telegraphy, left the Army and started work with the English De Forest Wireless Telegraph Syndicate, afterwards entitled the Amalgamated Radio Company. His connection with Marconi's Wireless Telegraph Company commenced with his joining the Field Station Department. In the formation of the Russian Company of Wireless Telegraphy and Telephony, 1908, appointed managing director of that company, a post which he has continued to occupy. Member of the Anglo-Russian Chamber of Commerce. On the outbreak of war placed his services at the disposal of his country, and did excellent service in Russia and at the War Office. Appointed Director of Wireless Telegraphy under the Government of India. Chevalier of Order of S. Anne, 3rd Degree, and of Order of S. Stanislas, 2nd Degree, with Crossed Swords.

Sins, Ernest.—B. 1859, Besançon, Alsace, where he received his early education. Joined the Ecole Polytechnique, and began his career by enrolling in the Corps of Telegraph Engineers. Participated in the organisation of the telegraphic and telephonic systems in Tunisia. Received an appointment in the Central Office of Posts and Telegraphs, Paris, 1892, where he ultimately rose to the position of Telegraph Engineer-in-Chief. Chief of the Correspondence Department of International Telegraphy, 1899, and took special interest in wireless telegraphy. Represented his country at the International Conferences on Radiotelegraphy held at Berlin, 1903, and acted as secretary to the commission appointed by the latter Conference for drawing up regulations. Subdirector of the French Telegraphic Department, 1911, but resigned from the public service in the same year in order to be at liberty to take part

in the development of wireless industry. One of the founders and directors of the Compagnie Générale Radiotélégraphique, and was afterwards managing director to the Compagnie Universelle de Télégraphie et de Téléphonie sans Fils. Since the beginning of 1918, general manager of the Compagnie Générale Radiotélégraphique.

Slee, Commander J. A., C.B.E., R.N. (Ret.).—B. May, 1878, Wimbledon. Educ. on training ship "Britannia." First appointment as midshipman was to H.M.S. "Centurion," on which vessel he sailed for China, 1894, being transferred, three years later, to the brig "Nautilus" for sailing experience. Passed for his lieutenant's commission, obtaining four firsts out of a possible five. After service on the "Decoy" "Ernest," "Anson" and "Severn," qualified as Torpedo Lieutenant, and spent a year on the staff of the "Defiance" at Devonport, where he gained his first wireless experience, 1901. Whilst attached to H.M.S. "Queen," 1906, eyesight trouble developed and he was obliged to transfer to shore service. For two years after quitting the sea he served as one of the Wireless Telegraph Experimental Officers on the "Vernon" at Portsmouth, and from 1908 until last year was in charge of all shore wireless and war signal stations in Great Britain. Promoted Acting Commander, 1913, Acting Captain, 1918. On the formation of the Wireless Board, Captain Slee was appointed its chief. Awarded an O.B.E., January, 1919, C.B.E., April, 1919. Retired from the Navy due to the eyesight trouble mentioned above, December 1st, 1919, with the rank of Commander. Joined the Marconi International Marine Communication Co. as Technical Superintendent and Adviser, January 1st, 1920.

Snell, Sir John Francis Cleverton, Kt. (Cr. 1914), **M.Inst.C.E.** He is Chairman of the Water-Power Resources Committee of the Board of Trade, and member of the Imperial Wireless Telegraphy Committee under the chairmanship of the Rt. Hon. Sir Henry Norman, Bart., M.P. Past President of the Institution of Electrical Engineers, Fellow of the American Institute of Electrical Engineers and a member of many other scientific societies. Until recently senior partner of Preece, Cardew, Snell and Rider, and is now Chief Electricity Commissioner under the "Electricity (Supply) Act, 1919." B. at Saltash in Cornwall, December 15th, 1869. Educ. at Plymouth Grammar School and King's College, London. After service (1883) with Woodhouse and Rawson, and (1889) with Crompton & Co., he was appointed Resident Engineer for the late General Webber, C.B., R.E., at South Kensington, and subsequently became the General's Chief Assistant. Was appointed Borough Electrical and Tramways Engineer at Sunderland in August, 1896. In 1906 started practice as Consulting Engineer, Westminster, first with Mr. S. S. Moore Ede and afterwards amalgamating with Preece, Cardew, Snell and Rider in 1910. Acted as principal technical witness for the Crown in the arbitration proceedings of the National Telephone Company, 1910. In 1917 appointed Member of the Electric Power Supply Committee of the Board of Trade, and in 1919 accepted the position of Chief Electricity Commissioner (Designate), in which capacity he undertook the piloting of the "Electricity (Supply) Bill" through both houses of Parliament. To fill this capacity he resigned his consulting practice, and position in his late firm. Address: Wey Barton, Byfleet, Surrey.

Solari, Marquis Lugi.—Cavaliere Ufficiale della Corona d'Italia, Cavaliere dei SS. Maurizio e Lazzaro, Commendatore of Danilo, and Cavaliere of St. Anna. Received decorations of bronze medals for the campaigns of China and Africa. B. in Turin. Was appointed officer of the Italian Royal Navy in 1890. Obtained the diploma of Electrical Engineer at the University of Turin in 1898. In 1900 placed in charge of the Laboratory of Wireless Telegraphy at the Royal Dockyard of Spezia. In 1902 took charge of the wireless telegraph station on the Italian warship "Carlo Alberto" during the historic experiments on that vessel conducted by Senatore Marconi. In 1903 delegate of the

Italian Government to the Berlin Wireless Conference. In 1904-1905 supervised the Wireless Telegraph Department of the Italian Ministry of Posts and Telegraphs. Official delegate of the Italian Government at the International Congress of Electricity held at St. Louis, U.S.A., in 1904. Joint inventor with Professor Lori, of the Padua University, of a magnetic relay. Has published several papers on wireless telegraphy in various periodicals and reviews. Since 1906 has devoted himself to the development of the Marconi system in Italy. Address: Via Maria Adelaide, 8, Rome (Italy).

Squier, Major-General Sir George Owen, K.C.M.G.—Chief Signal Officer U.S. Army. Formerly military attaché to the American Embassy in London. Educ. Johns Hopkins University, Baltimore. Graduated Doctor of Physics 1893. Worked as a research student under the late Professor Rowland. In the laboratory of the late Sir William Preece at the British General Post Office at the time that Mr. Marconi conducted his early demonstrations before the officials of that organisation. Discovered the use of living trees as a means of receiving wireless messages 1904, and published a paper entitled "The Absorption of Electro-Magnetic Waves by Living Vegetable Organisms." On June 28th, 1911, an important treatise by him, dealing with multiplex telephony and telegraphy by means of waves guided by wires, was read before the American Institute of Electrical Engineers. Author of numerous papers on the subject of wireless telegraphy and has devoted special attention to the use of wireless telegraphy in military operations. Awarded the Elliott Cresson Gold Medal for his researches in multiplex telephony 1912. Presented a paper on "Cable Telegraphy" to the Physical Society of London, June, 1915, advocating the adaptation of Wireless Engineering methods to ocean cables. Author of "Tree Telephony and Telegraphy." Member of National Academy of Sciences, 1919. Awarded the Franklin Medal, by the Franklin Institute of Philadelphia, Pa. 1919. Awarded the Distinguished Service Medal, United States Army, 1919. Address: Chief Signal Officer of the Army, War Department, Washington, D.C.

Stanley, Rupert. Principal of the Municipal Technical Institute, Belfast. Chevalier of the Legion of Honour.—B. in Ireland in 1876. Educ. Irish schools and universities. Joined technical staff of the Isle of Thanet Electrical Light and Power Company in 1899, and two years later was appointed Lecturer in Physics and Electrical Engineering at the Brighton School of Science and Technology. Returned to Belfast in 1903 as Professor of Physics and Electricity at Belfast Municipal Institute. Became a member of the Institution of Electrical Engineers, and in 1914 undertook the preparation of a "Textbook of Wireless Telegraphy," which has become a standard textbook on the subject, both at home and in America and is now published in two volumes, of which the second deals exclusively with valves and valve apparatus. Started war service as second-in-command of a Field Company in the Ulster Division, but was soon transferred to radiotelegraph work, and served in France from October, 1915 to April 1918, where he became Chief Wireless instructor to the B.E.F. Address: Municipal Technical Institute, Belfast.

Stone Stone, John.—Studied electricity, chemistry, physics and mathematics at Columbia University and Johns Hopkins University. Experimentalist in research laboratory, American Bell Telephone Company, 1890-99. Made some investigations in telephony without wires, 1892. Consulting Electrical Engineer and expert for the Ladd Wireless Telephone Syndicate, experimenting on directional signalling, 1899. Retained in 1900 by the Stone Wireless Telephone Syndicate, and in 1902 when the Stone Telegraph and Telephone Company was organised. Author of many scientific papers on wireless. Granted more than 100 U.S. patents in the radio field and a correspondingly large number of foreign patents. Fellow, American Academy of Arts and Sciences. Fellow, American Association of Advanced Science

Fellow and Past-President, Institute of Radio Engineers. Member or Associate of the following societies: American Institute of Electrical Engineers. American Electro-Chemical Society, U.S. Navy Institute, Franklin Institute, Mathematics and Physic Club, Boston Scientific Society. His investigations have been principally directed along the lines of eliminating interference in wireless telegraphy.

Swinburne, James, F.R.S.—B. Inverness, February 28th, 1858. Educ. Clifton College. Employed by Messrs. J. W. Swan and Co. 1881 to organise their lamp factory in Paris; later he went on a similar mission to America. Consulting engineer since 1894, and has attained considerable eminence in various branches of science. As an expert on wireless telegraphy his fame has been recognised by the Government. Member of the Technical Committee considering the Imperial Wireless Scheme, 1912. Member of various scientific societies, and is on the Council of some. President of the Institution of Electrical Engineers, 1902-3. Addresses: 82, Victoria Street, S.W.1; Woodhurst, Oxted, Surrey.

Swinton, Alan A. Campbell, F.R.S., M.Inst.C.E., M.I.E.E., M.I.M.E., President of the Wireless Society of London (1915). B. Scotland 1863. Opened career in 1882 at the Armstrong Works, Elswick. Consulting electrical engineer in London since 1887, having been responsible for the carrying out of many large electrical installations. He is Chairman of Crompton & Co., Ltd., and director of numerous electricity supply and engineering manufacturing companies. Associated with the development of the Parsons turbine and other important inventions. A Vice-President of R. Society of Arts, Chairman of the Council from 1917–19; Past-President of the Rontgen Society. Member of Exec. Comtee. of British Science Guild; a Manager of the R. Institution of Great Britain (1912–1915). Has devoted considerable attention to scientific research, including wireless telegraphy. Address: 66, Victoria Street, Westminster, S.W.1.

T

Tesla, Nikola.—B. Smiljan, Sika, Dalmatia, 1857. One of the foremost of the world's electricians. Quite early in life he began to take delight in arithmetic and physics. Graduated Carlstatt, 1873. Devoted his energy to electrical studies and investigations. Went to Gratz, where, at the Polytechnic School, he prepared for work as Professor in mathematics and physics. Whilst there he was so struck with the objections to the use of commutators and brushes that he made up his mind to remedy that defect in dynamo-electric machines. Visited America about 1882, where he captured the attention of the whole world with his fascinating experiments on high-frequency electric currents. Since 1890 devoted himself almost entirely to studies of alternating currents of high frequency and very high potentials.

Thoernblad, Thor. — Lieut., R. Swedish Engineers. B. Upsala, Sweden, June 10th, 1885. Pioneer of Wireless Telegraphy in Sweden. His interest in the theory and practice of wireless dates from 1899. Author of the first great Swedish standard work on Wireless Telegraphy, 1911. Passed his examination as student at the High School of Stockholm, 1904. Entered the Royal Engineers as Cadet, 1904. Commissioned 1906. Studied mathematics, physics and chemistry 1906-10, first at the Technological academy of Stockholm later at the University of Stockholm. By command of the Swedish Government studied Wireless Telegraphy in foreign countries. Devoted considerable attention to the use of wireless on aircraft. Author of a number of articles on radiotelegraphy in the scientific and daily press. Knight of the Order of the Crown of Italy. Address: Strandvägen, 7, Stockholm.

Todd, David Wooster, Captain, U.S. Navy. At present in command of the Flagship "Pittsburgh" in European waters. B. Round Valley, California, June 29th, 1874. Educ. private and public schools in Mich., Nev., and San Francisco. Appointed to Naval Academy, 1891, graduated in June, 1895. Has served at sea on the following vessels of the United States Navy: Constellation,

Monongahela, Olympia, Oregon, Wheeling, Rainbow, Chicago, Iowa, Newark, Denver, Monterey, Concord, Galveston, Wyoming, Dixie; has served ashore as instructor in ordnance, Naval Academy; in charge of Radio Division of Bureau of Steam Engineering, Navy Department, and as Assistant Superintendent of the Radio Service. Attended International Radio-Telegraphic Conference, London, 1912, as a delegate. Director Naval Communications, August 3rd, 1916, succeeding Capt. (now Rear-Admiral) W. H. G. Bullard, U.S. Navy. Attended Inter-Allied Radio Conference in Paris upon United States entry into European War, and subsequently organised the American end of the Inter-Allied Transatlantic Radio System. Also organised and directed the United States Cable Censorship, and served on the Censorship Board as Chief Cable Censor. Address: U.S.S. Pittsburgh, c.o. Postmaster, New York.

Traveilleur, Maurice.—B. Brussels, 1871. Graduated as engineer at Brussels University, 1893. Appointed electrical engineer to the late King of the Belgians, 1897. One of the founders of La Société Anonyme de Télégraphie Sans Fil, 1901, of which he is now managing director.

Tsiang Tseng-yi.—Native of the Haining District of the Chekiang Province. Acquired the third degree of Literature at the Metropolitan Examination in Peking, 1904, and appointed Junior Clerk of the Board of Revenues. Soon afterwards transferred in the same rank to the Board of Communications (then known as Yuchuanpu) by its special recommendation for dealing with telegraph matters. Chinese telegraphs were then administered partly by a commercial company and partly by the provincial viceroys and governors. Mr. Tsiang proposed that all the commercially and provincially owned telegraph lines be nationalised and placed under the direct control of the Yuchuanpu. This proposal received the approval of the Government, and was put into operation. In 1911, as Commissioner of Telegraphs of the Yuchuanpu, he caused two powerful radio stations to be established, one in Peking and the other at Nankin. Since their establishment the wireless service has been greatly improved and extended to such localities as Shanghai, Woosung, Foochow, and Canton, along the coasts, and Kalgan and Wuchang in the interior. Both the Ministries of War and Navy have followed in the steps of the Ministry of Communications by installing radio stations for their respective purposes. Mr. Tsiang served over ten years in the telegraph service, holding the following important positions: 1910-1911, Commissioner of Telegraphs of the Yuchuanpu; 1913-1916, Chief of the Financial Department of Telegraphs, Posts and Navigation. Acted as Chief of the Telegraph Department and Director-General of Telegraphs of the Ministry of Communications, and Chairman of the Chinese Society of Electrical Science.

Turner, Laurence Beddome, M.A., Fellow and Lecturer of King's College, Cambridge.—B. 1886. Educ. Bedford Grammar School and King's College, Cambridge (1904). First-class honours in Mathematical Sciences Tripos in 1907. Spent 1907-8 in research work at the C.U. Engineering Laboratory, receiving in 1908 the award of the University "John Winbolt Prize" for an essay on this research. After a year in the workshops and drawing office of Messrs. Siemens Bros. at Woolwich and Siemens u. Halske A.G. at Berlin, entered in 1910 the Engineer-in-Chief's office of the G.P.O. Engaged there in W/T experimental work, and in the design and installation of new ship-and-shore stations. Attached to the Army Signals Experimental Establishment at Woolwich 1916, where he designed wireless field apparatus, including the Infantry "Loop Set." Fellow and Lecturer of King's College, Cambridge, 1919. Member of the Imperial Wireless Telegraphy Committee, 1919.

Turner, Samuel, A.M.I.E.E., M.F.Aer.S., M.I.Radio.E. Educ. Barrow-in-Furness Sec. & Tech. Coll., under G. Grace, D.Sc., etc. Two years' works training at Messrs. Vickers, Maxim, Barrow. Appointed to post in Telephone Research Labs., London. Subjects included Telephony and Telegraphy, Valves and

valve circuits, Telephone transmission, high frequency measurements, Automatic Telephony, etc. Lecturer and Instructor to R.F.C. W/T Officers at Brooklands (under Major Prince) in W/Telegraphy and Telephony applied to Aircraft Dec. 1915—Oct. 1917. Research work in W/Telephony, C.W., etc. (using Triode valves) at R.F.C. W/T Exper. Station, Biggin Hill and Woolwich (1917–1918). Transferred to Air Ministry to develop and supervise Technical Section. Resumed civilian research work July, 1919. Inventions: Devices for W/Target Training of Pilots, Observers, etc. Publications: Papers (London Telephone Society). Articles: "Electrician" (and other papers), and I.C.S.; Textbook on Automatic Telephony, etc. Address: Park View, Ballards Lane, Finchley, N.3.

Turpain Professor Albert.—B. La Rochelle, December 2nd, 1867. Employed in the Department of Posts and Telegraphs of France, 1884-1887. Licentiate in physical science, 1888. Licentiate in mathematics, 1891. Obtained doctorate of science, 1889. As tutor of physics at the Faculty of Science, Bordeaux, succeeded in sending messages without wires from an equipment erected in the college buildings. Has experimented in wireless telegraphy with successful results since 1894. Applied himself to the question of tuning and (1899) experimented with a means for determining the direction of electromagnetic waves. Resumed these experiments, 1912. Succeeded in obtaining graphic records of time signals by means of a micro-amperemeter over a distance of 300 km. between Poitiers and Paris, 1911. Carried out successful experiments in photographically recording wireless telegraph signals which passed between Paris and Poitiers.

V

Vallauri, Giancarlo.—B. Rome, 1882. Educ. in the classical schools of Italy. Entered the Royal Naval Academy. Appointed officer of the Royal Italian Navy 1903. After a few years at sea he quitted the active naval service and joined the Polytechnic School in Naples, obtaining the diploma of engineer and the electrotechnic diploma, 1907. Since conducted electrical tuition in the Polytechnic Schools of Padua, Karlsruhe and Naples. Connected with many industrial electric establishments and placed his services at the disposal of the Royal Navy for the installation of wireless stations. Inaugurated at the Polytechnic School in Naples a course in Wireless Telegraphy 1912, and supervised that subject till the end of 1916, when he was called to the direction of the Institute of Electricity and Wireless Telegraphy of the Royal Navy by the Royal Naval Academy in Leghorn. His attention has mainly been turned to the study of ferro-magnetic phenomena, to which he has made important contributions. Has published a series of papers on Ionic Valves, which has won wide publicity and appreciation. Address: R. Accademia Navale, Leghorn, Italy.

Van der Pol, Balth, Jun.—Director of Physical Research Laboratory, Teyler's Institute (Haarlem).—B. January 27th, 1889, at Utrecht (Holland). Educ. at Utrecht, graduating as *Candidaat* in the University, (1914), and as *Doctorandus* (1916). Studied Experimental and Theoretical Physics, under Professors Julius and Ornstein. His interest in the theory and practice of wireless dates from 1904. Came to England in 1916 to study under Professor J. A. Fleming. Proceeded to Cambridge in 1917, working under Professor Sir J. J. Thompson, at the Cavendish Laboratory for about eighteen months. He is author of a number of valuable monographs upon physical and radio-telegraphic subjects. Appointed Conservator and placed in charge of the physical research laboratory of Teyler's Institute, Haarlem (Holland). He is now engaged on research work there with Professor H. A. Lorentz. Address: Physical Laboratory, Teyler's Institute, Haarlem, Holland.

Vanni, Dr. Giuseppe, B. Albano Laziale (Rome) in 1862. Graduated in science 1887. Went to Strassburg 1890, where under Professor Kohlrausch, of the Physical Institute, he studied electrical measurements. Appointed to teach physics at the Collegio Romano, Rome, 1894. Nom-

inated professor and director of the physical laboratory of the Military Radiotelegraphic Institute in Rome, 1912. Took part in the International Radiotelegraphic Conference of London, 1912, as a member of the Italian delegation, and also at the Conferences held in Paris in 1912 and 1913. His works are principally concerned with electrology, electrical engineering, and electrical waves. By means of an hydraulic microphone of his invention made interesting experiments in wireless telephony between Rome and Tripoli (1,000 km.) and between Rome and Treviso (420 km.), and in 1914 his paper on the "Progress and Actual State of Wireless Telegraphy and Telephony" gained the Cagnola prize of the Royal Lombard Institute of Science and Literature, in Milan. Address: Rome, Military Radiotelegraphic Institute, Viale Mazzini 10.

Vyvyan, R. N.—Educ. at Charterhouse. Received electrical and engineering training Faraday House. Joined Marconi's Wireless Telegraph Co., 1900. Built Poldhu Wireless Station, subsequently proceeding to Canada as Managing Engineer until 1908. In the course of his work visited most European countries and also South Africa and America. Responsible for design and construction of most of the high-power stations erected by the Marconi Company, including naval strategic stations and others erected for the Admiralty early in the late war. Joined R.F.C., 1916, and served in France. Later sent to America as member of the British War Mission. Demobilised early 1919, since when Superintending Engineer of the Marconi Company. In charge of the design, construction and management of all fixed wireless stations owned or erected by that company.

W

Walter, L. H., M.A., A.M.I.E.E. B. London, 1870. Educ. private schools in England, at Hanover, Germany, Trinity College, Cambridge (1894-8), where he took honours in Natural Sciences. Later carried out research work in the University Engineering Laboratory. Experimental assistant to Sir Hiram S. Maxim. Editor of "Science Abstracts," 1903, when that publication was taken over by the Institution of Electrical Engineers, which position he still holds. Inventor of several forms of detectors of electrical oscillations, and for his magnetic type of oscillation galvanometer was awarded the John Scott Medal. In 1905 he drew attention to the advantages of directive wireless telegraphy, and, associating himself with Captain Tosi and Dr. Bellini he introduced the directive system, and the wireless compass, into England. Address: Institution of Electrical Engineers, 1, Albemarle Street, W.1.

Weagant, Roy A.—B. Morrisburg, Ontario, Canada, 1881. Educ. Stanstead College, Stanstead, Quebec, Canada, and McGill University, Montreal, Canada. Graduated from Electrical Engineering Course, 1905. Studied Physics under Sir Ernest Brotherford and first became interested in wireless through witnessing some of his experiments in Hertzian waves. Gained engineering experience with the Montreal Light, Heat, and Power Company, the Westinghouse Electric Manufacturing Company of Pittsburg, Pa., and the De Laval Steam Turbine Company. Took up commercial wireless work in 1908. Entered service of the Marconi Wireless Telegraph Company of America, 1912, where he soon rose to the position of Chief Engineer. Fellow of the Institute of Radio Engineers and former member of its Board of Directors and Standardisation Committee. Inventor of a novel method of eliminating static interference. Address: Douglas Manor, Long Island.

Whiddington, Richard, M.A., D.Sc., Professor of Physics, University of Leeds. B. November 25th, 1885, in London. Educ. at St. John's College, Cambridge, where after taking degree in 1908, he undertook research work under Professor Sir J. J. Thomson at the Cavendish Laboratory. Elected Fellow of St. John's College 1911. In September, 1914, went to Royal Aircraft Factory, Farnborough, to design aircraft wireless apparatus for the Flying Corps. Received first commission in Army in 1915, leaving Farnborough soon after. During the

war designed a number of the standard R.A.F. wireless sets and assisted on the W/T Board and Inter-Allied W/T Commission in Paris. Demobilised with rank of Major, June 1919. Has published a number of original papers on various electrical subjects. Address: Leeds University.

Whitmore, G. Scovell.—B. Dawlish, 1881. Educ. St. Andrew's College, Dublin. Served under Eastern Telegraph Company, Ltd., at Porthcurnow and Malta cable stations. Entered Heaton works of Sir C. A. Parsons & Co., 1902, and became Chief Asst. to the Engr. and Gen. Manager of Northern Counties Electricity Supply Co., Ltd., in 1906. Joined the engineering staff of Marconi's Wireless Telegraph Co., Ltd. (1909), and appointed (1910) Managing Engr. at the Transatlantic W/T Station, Glace Bay, Canada. Since 1912 employed at the head office of Marconi's Wireless Telegraph Co., Ltd., mainly in connection with the construction and maintenance of high-power W/T stations, occupying the position of Act. Suptdng. Engr. August, 1916—March, 1919, during absence of the Suptdng. Engr. on military service.

Wichi Torikata, Chief Engineer of the Wireless Section in the Japanese Department of Communications. B. Japan, 1883. Holds the same position in Electric Material Section attached to the Electro Technical Laboratory. Trained to the profession of Electrical Engineering in the Engineering College of Tokio Imperial University. Graduated 1906. Devoted himself to the close study of Radiotelegraphy and Telephony, acting at one time as Assistant Engineer to Dr. Osuke Asano, ex-Director of the Electro Technical Laboratory; Chief Engineer of the Electrical Material Section at the Laboratory. Inventor and patentee of the Koseki or Mineral Detectors, and the T.Y.K. Oscillation Gap for use in Radiotelephony. The late Mikado of Japan recognised his services by awarding him the Fifth Degree of Decoration, bestowing this honour specifically for his services in connection with Wireless Detectors, whilst the Ruling Emperor has presented him with the Fourth Degree of Decoration on account of his Radiotelegraphic Researches. Author of "Some Researches in Radio-telegraphy and Telephony," and the Senate of Tokio University marked their appreciation of his efforts by bestowing upon him in 1915 the title of "Dr. Engineer." Has received many prizes for technical work, including the First Medal of the Japanese Electric Engineers' Society (established 1888), and Academy Prize and Medal granted by the Japanese Imperial Academy. Lecturer in Radiotelegraphy and Telephony at the Electric Engineering College of Kyushu Imperial University. Address: No. 2801 Sanno, Omori, near Tokio.

Wien, Professor Max.—B. Königsberg, 1866. Made a special study of the subject of physics under Helmholtz and others, and assisted Röntgen, 1891-1893. Devoted considerable attention to the study of electromagnetic waves and their propagation, and was the originator of the quenched spark.

Wilson, Brig.-Gen. Samuel Herbert, C.B. (1918), **C.M.G.** (1914); Officier Legion d'Honneur; French Croix de Guerre; Commandeur de la Couronne, Belgium; Belgian Croix de Guerre. B. 1873. Entered Army, R.E., 1893. Captain 1904, Major 1913, Bt. Lt.-Col. 1916, Bt. Col. 1917. Served S. Africa, 1899-1900 (Queen's medal with two clasps). Served great war, 1914-18; General Staff Officer, 2nd Grade, 1911-15; General Staff Officer 1st Grade, 1915-16; Brig.-Gen. for Staff, 1916. Secretary Imperial Communications Committee; Wireless Telegraphy Committee; Overseas Defence Committee; Home Ports Defence Committee.

Y

Yagi, Professor Hideji, Professor of Electrical Engineering at the Tohoku Imperial University and member of the Institute of Radio Engineers.—B. Osaka, January, 1886. Graduated from the Tokyo Imperial University, 1909. Lecturer and later Professor of Electrical Engineering at the Sendai Higher School. Studied in Dresden, London, and Harvard, 1913-1916, engaging at the same time

in several researches on radio frequency phenomena. Author of many scientific papers.

Yokoyama, Eitaro. — B. 1883. Graduated at the Engineering College of the Tokyo Imperial University, 1908. Wireless Engineer to the Department of Communications. Engages in wireless work in the Electrotechnical Laboratory. One of the inventors of T.Y.K. oscillations gap of radiotelephony. Granted the Academy prize and medal of the Japanese Imperial Academy, and the 5th Order of Merit for his wireless investigations and inventions.

Z

Zenneck, Professor, Dr. J.—Professor of Experimental Physics at Technical College, Munich. B. April 15th, 1871, in Wurtemberg. Studied for four years in a Theological College at Tübingen. Abandoning Theology, studied mathematics and natural history, particularly zoology, 1889-1894. Passed the State examination in these subjects 1894. Obtained his doctorate, 1894. Studied natural history in London and elsewhere. Subsequently devoted himself entirely to physics. Assistant in the Physical Institute in Strassburg, 1895-99. Engaged in making tests with wireless telegraphy in the North Sea, 1899-1900. Lecturer, Assistant Professor of Physics in the Technical College, Dantzic, 1905 and 1911. Professor of Physics at the Technical College, Brunswick, 1906. Joined one of the largest chemical works in Germany, 1909. During part of the war Technical Adviser to the Atlantic Communication Co., which then operated Sayville wireless station. Address: Technische Hochschule, München, Germany.

OBITUARY

SINCE we went to press with our last edition the world of wireless has had to mourn the loss of a number of prominent men.

* * * * * *

On November 10th, 1918, there passed away **MR. LLEWELLYN PREECE,** son of the late Sir William H. Preece and one of the principal partners in the firm of Preece, Cardew, Snell and Rider. Following in the footsteps of his distinguished father, he devoted a large part of his life work to radiotelegraphic pursuits, and for the last thirteen years had been mainly responsible for wireless work in connection with the Crown Colonies, many of which entrusted the transaction of their radiotelegraphic affairs to the firm of consulting engineers of which he was a partner.

MR. ERNEST OCTAVIUS WALKER, A.M.I.E.E., died on February 12th, 1919. He was a grandson of the late Bishop Corrie of Madras and was born in 1850. His education was at private schools and at Regent's Park College. The late Sir William Preece was at one time his tutor. In 1871 he entered the Indian Telegraph Department, subsequently being placed in charge of the telegraphs of the Lushai Expedition. For his services he was mentioned in despatches and awarded the C.I.E. Retiring from this position in India he was appointed Superintendent of Telegraphs in Ceylon, which post he held until 1899, when he entered the firm of Messrs. Preece & Cardew, of Westminster. He was the author of several papers, amongst which may be mentioned one in 1883 on "Earth Currents in India," and another (1888) on "A Magnetic Storm in India." He was awarded the Fahie premium for a further communication on "Earth Currents in India." His death has left an unfortunate blank in the ranks of scientists.

On April 4th, 1919, **SIR WILLIAM CROOKES,** O.M., F.R.S., departed this life in his 88th year. Born in London on June 17th, 1832, he was connected with the Royal College of Chemistry first as a pupil and afterwards as Senior Assistant. In 1854 he became Superintendent of the Meteorological Department of Radcliffe Observatory, Oxford, and was elected Fellow of the Royal Society in 1863, becoming President in 1913. Although his career was mainly devoted to chemical research, he carried out a number of original investigations in radiotelegraphy, and published some interesting articles on the subject, amongst them being a notable forecast of wireless developments, since most remarkably realised in the greater number of particulars, which appeared as early as February, 1892, in the *Fortnightly Review;* four years before Marconi took out his first British patent, and but five years after Hertz announced his famous discoveries.

We regret to have to record the death on May 9th, 1919, of **MR. HENRY SPEARMAN SAUNDERS,** a Director of Marconi's Wireless Telegraph Co., Ltd. Born in April, 1841, he was the son of the Hon. Frederick Saunders, who was Treasurer of Ceylon, to which office the latter was succeeded by his eldest son, Sir Frederick Richard Saunders, K.C.M.G. Mr. Henry Saunders joined his parents in Ceylon at the age of 18, and devoted himself with conspicuous ability and success to the public and commercial life of the Colony. He was for two years the Chairman of the Ceylon Planters' Association, and became instrumental in carrying through important schemes of railway extension and the construction of roads. It was in 1899 that Mr. Saunders joined the Board of Marconi's Wireless Telegraph Co., Ltd., and he accompanied Senatore (then Mr.) Marconi to America on the occasion of the latter's visit in 1902.

On June 30th, 1919, full of years and honours, died the **RT. HON. LORD RAYLEIGH,** O.M., at his residence at Terling Place, Witham, Essex. Born November 12th, 1842, he won the first "Smith Prize" at Cambridge and in 1866 was elected Fellow of Trinity College. He succeeded to the title on the death of his father in 1873, and in the same year became Fellow of the Royal Society. He succeeded Clerk Maxwell in 1879 as Professor of Experimental Physics at Cambridge. His work in physics has been of a varied and thorough character. He discovered argon, and his investigations in electricity were made the basis on which the legal definitions of the electrical standards of E.M.F. current and resistance were established. He received the Nobel Prize for Physics in 1904, and to him we are largely indebted for the establishment of the National Physical Laboratory, Teddington.

On November 19th, 1919, died the eminent Dutch radio scientist **JOHANN CHRISTOPH. VAN ITERSON,** Knight of the Oranje-Nassau Order and of the Légion d'Honneur. He was born at Beetgum (in the Island of Friesland) on May 22nd, 1873. In 1895 he became a Lieutenant, Second Class, of the Royal Dutch Navy, and shortly afterwards obtained the diploma of Electrical Engineer at Liège. In 1903 he became Superintendent of the Wireless Telegraph Section of the Dutch Navy at Amsterdam, and specialised in directive radiotelegraphy. Promoted to the rank of Commander, he was in charge of the war vessel "Assahan" when he was killed by misadventure on the Island of Ambong, off the coast of North Borneo, in 1919. His radiotelegraphic researches have formed the subject of numerous papers published in naval periodicals.

LITERATURE
: SECTION :

(A) New Books published in 1919.

(B) Résumé of Articles published in 1919.

(C) Standard Publications on Wireless :—

(i) Books.

(ii) Periodicals.

LITERATURE OF WIRELESS TELEGRAPHY AND TELEPHONY

THE literature of radiotelegraphy and telephony increases year by year, and has now reached the stage when we consider that our readers will find it useful to have a record of the various items which have appeared during the past year, not merely in the shape of books, but also of periodical publications. The *résumé* which finds a place below covers only such items as deal directly with the subject of this volume; for works and papers on the more general subjects we must refer readers elsewhere.

(A) NEW BOOKS DEALING WITH WIRELESS PUBLISHED DURING 1919.

THE PRINCIPLES OF ELECTRIC WAVE TELEGRAPHY AND TELEPHONY. *J. A. Fleming, D.Sc., F.R.S.* 4th Edition. Pp. xv.+707. Price 42/- net. (Longmans, Green and Co., London.)

THE THERMIONIC VALVE IN RADIOTELEGRAPHY AND TELEPHONY. *J. A. Fleming, D.Sc., F.R.S.* Pp. xv.+280. Price 15/- net. (The Wireless Press, Ltd., London.)

TEXT BOOK OF WIRELESS TELEGRAPHY. *Rupert Stanley.* 2nd edition. In Two Volumes. Vol. I., GENERAL THEORY AND PRACTICE. Pp. xiii.+471. Vol. II., VALVES AND VALVE APPARATUS. Pp. ix.+357. Price 15/- each. (Longmans, Green and Co., London.)

PRÉCIS D'ÉLECTRICITÉ THÉORIQUE. *L. Bloch.* Pp. vi.+476. Price 30 fr. (Gauthier Villars et Cie., Paris.)

LA TÉLÉGRAPHIE SANS FIL, LA TÉLÉPHONIE SANS FIL—APPLICATIONS DIVERSES. *G. E. Petit* and *L. Bouthillon.* Pp. vii.+304. Price 15 fr. (Librairie Delagrave, Paris.)

INTRODUCTION À L'ÉTUDE DES RADIOCOMMUNICATIONS. *L. Bouthillon.* Pp. ix.+192. Price 20 fr.; Cloth, price 25 fr. (Delagrave, Paris.)

ELEMENTS OF RADIOTELEGRAPHY. *E. W. Stone.* Pp. 265. Price $2.50. (D. van Nostrand Co., New York.)

WIRELESS TELEGRAPHY AND TELEPHONY. *A. P. Morgan.* Pp. 154. Price $1.25. (N. W. Henley Co., New York.)

NOUVEAU MANUEL PRATIQUE DE T.S.F. *P. le Graverend.* 6th Edition. Pp. 72. Price 1.75 fr. (G. Péricaud, Paris.)

THÉORIE DE LA T.S.F. PAR ANALOGIES MÉCANIQUES. *P. Dapsence.* 2nd Edition. Pp. 92. Price 1.75 fr. (G. Péricaud, Paris.)

LES TUBES À VIDE EN RADIOTÉLÉGRAPHIE. *P. Dapsence.* Price 1.50 fr. (G. Péricaud, Paris.)

LA MEMOIRE FACILE DE L'INDUCTION ENTRE SPIRES. *P. Dapsence.* Price 0.50 fr. (G. Péricaud, Paris.)

TELEPHONY WITHOUT WIRES. *P. R. Coursey, B.Sc., A.M.I.E.E.* Pp. xi.+414. Price 15/- net. (The Wireless Press, Ltd., London.)

ALTERNATING CURRENT WORK. An outline for Students of Wireless Telegraphy. *A. Shore, A.M.I.E.E.* Pp. ix.+163. Price 3/- net. (The Wireless Press, Ltd., London.)

GUIDE TO THE STUDY OF THE IONIC VALVE, SHOWING ITS DEVELOPMENT AND APPLICATION TO WIRELESS TELEGRAPHY AND TELEPHONY. *W. D. Owen, A.M.I.E.E.* Pp. vii.+59. Price 2/6 net. (Sir Isaac Pitman and Sons, London.)

T.S.F. VADE-MECUM DE L'AMATEUR SANS-FILISTE. *S. Mariens.* (Librairie Amat., Paris.)

THE PRINCIPLES UNDERLYING RADIOCOMMUNICATION. Signal Corps, U.S.A. Pp. 355. Price 55c. (Government Printing Office, Washington.)

THE PRINCIPLES OF RADIOTELEGRAPHY. *C. M. Jansky.* Pp. ix.+242. Price 10/- net. (Hill Publishing Co., London; McGraw-Hill Book Co., New York.)

MANUAL OF RADIOTELEGRAPHY AND TELEPHONY FOR THE USE OF NAVAL ELECTRICIANS. *S. S. Robison.* 5th Edition. Pp. 307. Price 10/- net. (The United States Naval Institute, Annapolis, Md.)

USEFUL NOTES ON WIRELESS TELEGRAPHY. *H. E. Penrose.* In Five Booklets. Book I., DIRECT CURRENT, pp. 65; Book II., ALTERNATING CURRENT, pp. 50; Book III., HIGH FREQUENCY CURRENT, AND WAVE PRODUCTION, pp. 66; Book IV., THE MARCONI 1½-KW. SHIP SET, pp. 77; Book V., THE OSCILLATION VALVE, pp. 53. Price 1/4 each net. (The Wireless Press, Ltd., London.)

ELEMENTS OF THE ELECTROMAGNETIC THEORY OF LIGHT. *L. Silberstein, Ph.D.* Pp. 48. Price 3/6 net. (Longmans, Green and Co., London.)

THE OSCILLATION VALVE. *R. D. Bangay.* Price 5/- net. (The Wireless Press, Ltd., London.)

TELEGRAFIA Y TELEFONIA SIN HILOS. *F. Villaverde y Zubildia.* (Gallach, Barcelona.)

THÉORIE GÉNÉRALE DE L'ÉLECTROMAGNETISME. *G. E. Pineau.* Pp. 72. Price 5.25 fr. (Dunod, Paris.)

COURS ÉLÉMENTAIRE DE TÉLÉGRAPHIE SANS FIL. *G. Viard.* Pp. 300. Price 12 fr. (Librairie de l'Enseignement Technique, Paris.)

THE WIRELESS EXPERIMENTER'S MANUAL. *E. E. Bucher.* Pp. 350. Price $2.25. (The Wireless Press Inc., New York.)

HOW TO CONDUCT A RADIO CLUB. *E. E. Bucher.* Pp. 148. Price 75c. (Wireless Press Inc., New York.)

THE AMATEUR OPERATOR'S DIARY AND NOTEBOOK, 1920. Price 4/6 net. (The Wireless Press, Ltd., London.)

THE WIRELESS OPERATOR'S DIARY AND NOTEBOOK, 1920. Price 4/6 net. (The Wireless Press, Ltd., London.)

NEW RADIO PERIODICALS STARTED DURING 1919.

THE RADIO REVIEW, A MONTHLY RECORD OF SCIENTIFIC PROGRESS IN RADIOTELEGRAPHY AND TELEPHONY. Edited by *Prof. G. W. O. Howe, D.Sc.*, assisted by *Philip R. Coursey, B.Sc.* Price 2/6 monthly. (The Wireless Press, Ltd., London.)

RADIO AMATEUR NEWS. Edited by *H. Gernsback.* Price 15c. monthly. (Experimenter Publishing Co., New York.)

(B) RÉSUMÉ OF ARTICLES PUBLISHED DURING 1919

A complete list of all articles dealing with wireless would occupy too much space in a volume of this character. A review of radio literature is now being issued monthly in the pages of *The Radio Review*, so that a complete list of such articles as are published month by month, with abstracts of their contents, is now available. The following list, therefore, merely contains references to the most important only of the technical articles that have appeared during the past year. These are roughly classified under separate headings, but it should be noted that in many cases articles may refer to more than one branch of the subject. This is particularly the case with articles dealing with valves, which have applications in almost every branch of radio work.

RADIO FREQUENCY MEASUREMENTS AND THEORY.

MEASUREMENT OF RADIO FREQUENCY RESISTANCE, PHASE DIFFERENCE AND DECREMENT. *J. H. Dellinger.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 27, February 1919.)

HETERODYNE WAVEMETER. *J. Scott-Taggart.* (*Electrician*, 83, p. 243, September 1919.)

AIRPLANE ANTENNÆ CONSTANTS. *J. M. Cork.* (*Bulletin Bureau of Standards*, 15, p. 199, September 1919.)

SOME RADIO FREQUENCY PHENOMENA. *N. W. McLachlan.* (*Year-Book of Wireless Telegraphy and Telephony*, 1919, p. 937.)

A NEW METHOD OF USING CONTACT DETECTORS IN RADIO MEASUREMENT. *L. W. Austin.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 257, June 1919.)

THE FUNDAMENTAL OSCILLATION AND THE HIGHER HARMONICS OF HOMOGENEOUS AND NON-HOMOGENEOUS ANTENNÆ. *L. Dubar.* (*Revue Générale de l'Électricité*, 5, p. 284, February 1919.)

THE MEASUREMENT OF THE PEAK POTENTIAL OF AN A.C. SOURCE. *C. C. Paterson* and *N. Campbell.* (*Philosophical Magazine*, 37, p. 301, March 1919.)

THE SPECIFIC CONDUCTIVITY OF THE EARTH'S CRUST (AT HIGH FREQUENCIES). *M. Abraham, H. R. von Traubenburg*, and *J. Pusch.* (*Physikalische Zeitschrift*, 20, p. 145, April 1919.)

THE CONDUCTIVITY OF SEA WATER (AT FREQUENCIES UP TO ONE HUNDRED THOUSAND). *H. R. Rivers-Moore.* (*Electrician*, 82, p. 174, February 1919.)

AN ABSOLUTE MEASUREMENT OF THE TIME PERIOD OF HIGH FREQUENCY ELECTRICAL OSCILLATIONS. *H. Abraham* and *E. Bloch.* (*Comptes Rendus*, 168, p. 1105, June 1919.)

QUANTITATIVE EXPERIMENTS WITH COIL ANTENNÆ IN RADIO-TELEGRAPHY. *L. W. Austin.* (*Journal of the Washington Academy of Sciences*, 9, p. 335, June 1919.)

RADIO TRANSMISSION FORMULÆ FOR ANTENNÆ AND COIL AERIALS. *J. H. Dellinger.* (*Journal of the Franklin Institute*, 188, p. 99, July 1919.)

SENSITIVE APPARATUS FOR THE MEASUREMENT OF ALTERNATING CURRENTS. *H. Abraham* and *E. Bloch.* (*Comptes Rendus*, 169, p. 59, July 1919.)

THE MEASUREMENT OF ALTERNATING WAVES WITH THE BRAUN TUBE. *E. Lubke.* (*Electrician*, 83, p. 270, September 1919.)

APPLICATIONS OF THE CATHODE RAY TUBE IN RADIO WORK. *L. E. Whittmore* and *L. M. Hull.* (*Physical Review*, 14, p. 267, September 1919.)

ELECTRIC OSCILLATIONS IN ANTENNAS AND INDUCTANCE COILS. *J. M. Miller.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 299, June 1919.)

A STUDY OF ELECTROSTATICALLY COUPLED CIRCUITS. *W. O. Lytle.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 427, August 1919.)

THE RADIATING POWER AND DIRIGIBILITY OF SOME ANTENNÆ. *W. Burstyn.* (*Jahrbuch der Drahtlosen Telegraphie*, 13, p. 362, January 1919.)

THE NATURAL FREQUENCY OF ANTENNÆ OSCILLATIONS. *A. Meissner.* (*Physikalische Zeitschrift*, 20, p. 130, March 1919.)

THE TWO FREQUENCIES OF COUPLED CIRCUITS. *J. Salpeter.* (*Jahrbuch der Drahtlosen Telegraphie*, 13, p. 385, January 1919.)

THE INDUCTANCE OF SINGLE LAYER RECTANGULAR COILS. *G. W. O. Howe.* (*Radio Review*, 1, p. 124, December 1919.

A COMPARISON OF COILS AND AERIALS FOR RECEPTION. *M. Abraham.* (*Jahrbuch der Drahtlosen Telegraphie*, 14, p. 259, August 1919.)

CALCULATION OF THE SELF-INDUCTANCE OF RECTANGULAR COILS. *A. Esau.* (*Jahrbuch der Drahtlosen Telegraphie*, 14, p. 271, August 1919.)

SIMPLIFIED INDUCTANCE CALCULATIONS. *P. R. Coursey.* (*Proceedings of the Physical Society of London*, 31, p. 155, June 1919; *Wireless World*, 7, p. 380, October 1919.)

A SIMPLE DERIVATION OF THE FORMULÆ FOR THE RESONANCE CURVES OF A DAMPED VIBRATION AND SOME PROPERTIES THEREOF. *B. van der Pol.* (*Electrician*, 83, p. 225, September 1919.)

PRINCIPLES OF RADIO TRANSMISSION AND RECEPTION WITH ANTENNA AND COIL AERIALS. *J. H. Dellinger.* (*Bulletin of the Bureau of Standards*, 15, p. 435, December 1919; *Proceedings of the American Institute of Electrical Engineers*, 38, p. 1095, October 1919.)

THE CALCULATION OF ANTENNA CAPACITY. *L. W. Austin.* (*Journal of Washington Academy of Sciences*, 9, p. 393, August 1919.)

THE CALCULATION OF THE NATURAL WAVELENGTH OF AERIALS. *A. Meissner.* (*Jahrbuch der Drahtlosen Telegraphie*, 14, p. 269, August 1919.)

INDUCTANCE, CAPACITY AND RESISTANCE OF COILS AT RADIO FREQUENCY. *L. E. Whittmore* and *J. Bright.* (*Physical Review*, 14, p. 170, August 1919.)

RADIATION FROM COMPOUND ANTENNÆ. *M. Abraham.* (*Archivs für Elektrotechnik*, 8, p. 42, July 1919.)

HYSTERESIS AND EDDY CURRENT LOSSES IN IRON AT RADIO FREQUENCIES. *C. Nusbaum.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 15, February 1919.)

THE NATURAL FREQUENCY OF A CIRCUIT CONTAINING AN IRON CORE INDUCTANCE. *H. G. Cordes.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 73, February 1919.)

HIGH FREQUENCY MAGNETISATION—THE OLD AND THE NEW POINT OF VIEW. *H. Fassbender.* (*Jahrbuch der Drahtlosen Telegraphie*, 14, p. 222, August 1919.)

A NOTE ON LOSSES IN SHEET IRON AT RADIO FREQUENCIES. *M. Latour.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 6, February 1919.

THE DAMPING OF WIRELESS TELEGRAPHY SIGNALS. *G. H. Wood.* (*Wireless World*, 7, p. 274, August 1919.)

THE MEASUREMENT OF SIGNAL STRENGTH. *W. H. Eccles.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 267, June 1919.)

TRANSMITTING APPARATUS.

THE OPERATION OF THE A.C. QUENCHED SPARK TRANSMITTER. *R. Schmidt.* (*Elektrotechnische Zeitschrift*, 40, p. 502, November 1919.)

A SPECIAL TYPE OF QUENCHED SPARK TRANSMITTER. *D. G. McCaa.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 409, August 1919.)

ON THE MULTI-SECTION QUENCHED GAP. *M. Shuleikin* and *I. Freiman.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 417, August 1919.)

THE MARCONI TIMED SPARK CONTINUOUS WAVE TRANSMITTER. *P. R. Coursey.* (*Wireless World*, 7, p. 310, September 1919.)

MUSICAL SPARKS IN WIRELESS TELEGRAPHY. *T. Minohara.* (*Revue Générale de l'Électricité*, 5, p. 747, May 1919.)

POULSEN SYSTEM OF WIRELESS TELEGRAPHY. *G. Pession.* (*L'Elettrotecnica*, 6, p. 126, March 1919.)

THE POULSEN WIRELESS SYSTEM. (*Wireless World*, 7, p. 8, April 1919.)

THE DEVELOPMENT OF ARC RADIO TRANSMITTERS. *A. L. Anderson* and *H. F. Elliott.* (*Electrical World*, 74, p. 452, August 1919.)

LOW POTENTIAL RADIO FREQUENCY ARC. *C. W. Noller.* (*Radio Amateur News*, 1, p. 70, August 1919.)

THE GENERATION OF HIGH-TENSION DIRECT CURRENT. *M. Schenkel.* (*Elektrotechnische Zeitschrift*, 40, p. 333, July 1919.)

THE DESIGN OF RADIO TRANSMITTERS. *M. G. Spencer.* (*Electrical Review* (Chicago), 74, pp. 456, 479 and 542, April 1919.)

SIMULTANEOUS TRANSMISSION AND RECEPTION IN WIRELESS STATIONS. *M. Latour.* (*Electrician*, 82, p. 574, May 1919.)

UNI-DIRECTIONAL TRANSMITTING SYSTEM. *C. S. Franklin.* (*Wireless Age*, 6, p. 19, June 1919.)

PRACTICAL NOTES ON THE USE OF SMALL POWER CONTINUOUS WAVE SETS. *J. Scott-Taggart.* (*Wireless World*, 7, pp. 42, 93 and 152, April 1919.)

TRANSATLANTIC RADIO COMMUNICATION. *E. F. W. Alexanderson.* (*Telegraph and Telephone Age*, 37, p. 506, October 1919; *Proceedings of the American Institute of Electrical Engineers*, 38, p. 1077, October 1919.)

RADIOTELEPHONY.

A REVIEW OF THE METHODS AND PROGRESS OF RADIOTELEPHONY. *P. R. Coursey.* (*Year-Book of Wireless Telegraphy and Telephony*, 1919, p. 914.)

SIMULTANEOUS SENDING AND RECEIVING. *E. F. W. Alexanderson.* (*Proceedings of the Institute of Radio Engineers*, 7, p. 363, August 1919.)

WIRELESS TELEPHONY. *H. Eales.* (*Jahrbuch der Drahtlosen Telegraphie*, 13, p. 560, March 1919.)

RADIOTELEPHONY. *N. H. Slaughter.* (*Telegraph and Telephone Age*, 37, p. 580, November 1919.)

MERCURY VAPOUR MODULATOR FOR WIRELESS TELEPHONY. *I. Langmuir.* (*Wireless Age*, 6, p. 15, May 1919.)

RADIOTELEPHONY. *E. B. Craft* and *E. H. Colpitts.* (*Proceedings of the American Institute of Electrical Engineers*, 38, p. 337. March 1919.)

MAGNETIC MODULATING SYSTEM FOR WIRELESS TELEPHONY. *R. V. L. Hartley.* (*Wireless Age*, 6, p. 20, February 1919.)

AËROPLANE RADIOTELEPHONY. *H. M. Stoller.* (*Electrical Journal*, 16, p. 211, May 1919.)

WIRELESS TELEPHONY. *C. Gutton.* (*Bulletin, Société Française des Électriciens*, 9, p. 323, May 1919.)

METHOD OF MODULATING ANTENNA CURRENTS. (*Wireless Age*, 6, p. 24, July 1919.)

SOME ASPECTS OF RADIOTELEPHONY IN JAPAN. *E. Yokoyama.* (*Wireless World*, 6, p. 569, January 1919.)

TRANSATLANTIC WIRELESS TELEPHONY. (*Wireless World*, 7, p. 196, July 1919.)

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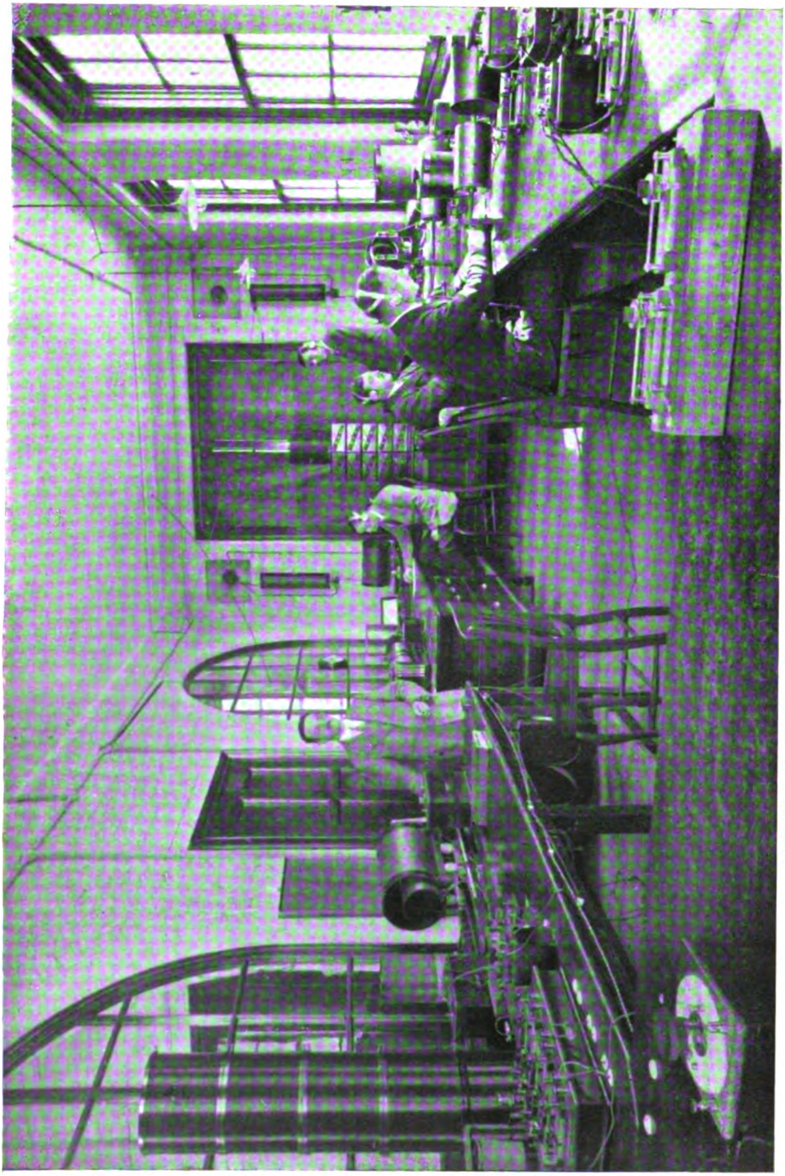
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Telegrafia y Telefonia sin Hilos. F. VILLAVERDE and ZUBILDIA. Pp. 180. (Gallach, Barcelona.)

Teoria de Maxwell y las Oscilaciones Hertzianas. E. POINCARE. With Appendix, "Los Ultimos Adelantos de la Telegrafia Sin Hilos," by P. H. Basauri, S.J. Price 2.50 pesetas. (Tipograia Catolica, Caspa 108, Barcelona.)

Valvulas Termoionicas. G. ORTEGA. (Cia. Nacional de T.S.H., Calle de Alcalá 43, Madrid.)

SWEDEN.

Handbok i Radiotelegrafi. J. GUNNAR HOLMSTROM. (Stockholm.)

Lärobok i Trädlös Telegrafi. F. ZETHRAEUS.

Trädlös Telegrafi. THOR THÖRNBLAD.

SWITZERLAND.

Drahtlose Telegraphie im Interen Recht und Völkerrecht. DR. J. MEILI. Price frs. 4.50. (Institut Artistique Orell Füssli, Zurich.)

UNITED STATES.

Directions for Designing, Making, and Operating High Pressure Transformers. PROFESSOR F. E. AUSTIN. Price 3s. ("Capital City Press," Montpelier, Vt., U.S.A.)

Elements of Radiotelegraphy. E. W. STONE. Pp. 265. Price $2.50. (D. Van Nostrand and Co., 25, Park Place, New York.)

Experimental Wireless Stations—Their Theory, Design, Construction and Operation. P. E. EDELMANN. New edition. Pp. 272. Price $1.5. (Published by the Author, Minneapolis, Minn., U.S.A.) 1920.

Experiments with Alternate Currents of High Potential and High Frequency. NIKOLA TESLA. Price $1.00. (McGraw-Hill Book Co., Inc., New York.) 1904.

Formulae and Tables for the Calculation of Alternating Current Problems. LOUIS COHEN. Pp. 282. Price $3. (McGraw-Hill Book Co., Inc., New York.)

How to Conduct a Radio Club. E. E. BUCHER. Pp. 148. Price 75 cents. (Wireless Press Inc., New York.) 1919.

How to Make Low Pressure Transformers. PROFESSOR F. E. AUSTIN. Price 90 cents. (Published by the Author at Hanover, N.H.)

How to Pass U.S. Government Wireless License Examinations. E. E. BUCHER. Price 75 cents. (Wireless Press Inc., New York.)

Manual of Radiotelegraphy and Telephony, for the Use of Naval Electricians. S. S. ROBISON, U.S.N. 5th edition. With revisions and additions by Capt. D. W. Todd, U.S.N., and Lieut.-Commr. S. C. Hooper, U.S.N. Pp. 307. Price 10s. net. (The United States Naval Institute, Annapolis, Md.) 1920.

***Maxwell's Theory and Wireless Telegraphy.** H. POINCARE and F. K. VREELAND. Price 10s. 6d. (McGraw-Hill Book Co. Inc., New York.)

Methods of Measuring Electrical Resistance. E. F. NORTHRUP, Ph.D. Pp. 390. Price $4.00. (McGraw-Hill Book Co. Inc., New York.)

Military Signal Corps Manual. MAJOR J. A. WHITE. Price $2.25. (Wireless Press Inc., New York.)

Operators' Wireless Telegraph Handbook. (Treatise on Construction and Operation of Wireless Telegraph and Telephone.) V. H. LAUGHTER. Pp. 180. Price $1.00. (S. J. Drake and Co., Chicago.)

Practical Aviation. MAJOR J. A. WHITE. Pp. 200. Price $2.25. (Wireless Press Inc., New York.)

Practical Electricity. C. W. SWOOPE. 15th edition. Price $2.00. (D. Van Nostrand and Co., 25, Park Place, New York.)

Practical Uses of the Wave Meter in Wireless Telegraphy. J. O. MAUBORGNE. Pp. 74. Price $1.00. (McGraw-Hill Book Co., Inc., New York.)

Practical Wireless Telegraphy. E. E. BUCHER. Pp. 352. Price $2.25. (Wireless Press Inc., New York.)

Principles of Radiotelegraphy. C. M. JANSKY. Pp. 242. Price $2.50. (McGraw-Hill Book Co. Inc., New York.)

Principles Underlying Radio-Communication. SIGNAL CORPS, U.S.A. Pp. 355. Price 55 cents. (Government Printing Office, Washington.) 1919.

Radio Communication. JOHN MILLS. Pp. 205. Price $1.75. (Mc. Graw-Hill Book Co. Inc., New York.) 1918.

Radio Instruments and Measurements. Pp. 320. Price $1.75. (Wireless Press Inc., New York.)

Radiotelephony. DR. A. N. GOLDSMITH, B.Sc., Ph.D. Pp. 256. Price $2.50. (Wireless Press Inc., New York.) 1918.

The Book of Wireless. A. F. COLLINS. Pp. 222. Price $1.50. (D. Appleton and Co., 29/35, West 32nd Street, New York.)

Telegraph Engineering. E. HAUSMANN. Price $3.00. (D. Van Nostrand and Co., 25, Park Place, New York.)

Vacuum Tubes in Wireless Communication. E. E. BUCHER. Pp. 202. Price $2.25. (Wireless Press Inc., New York.)

Wireless Experimenter's Manual. E. E. BUCHER. Pp. 350. Price $2.25. (Wireless Press Inc., New York.) 1919.

Wireless Telegraph Construction for Amateurs. A. P. MORGAN. Pp. 236. Price $1.50. (D. Van Nostrand and Co., 25, Park Place, New York.)

Wireless Telegraphy and Telephony. C. I. HOPPOUGH. Pp. 236. Price $1.50. (Henley Publishing Co., 132, Nassau Street, New York.)

Wireless Telegraphy and Telephony (Simply Explained). A. P. MORGAN. Pp. 154. Price $1.25. (Henley Publishing Co., 132, Nassau Street, New York.)

Wireless Telegraphy and Wireless Telephony. A. E. KENNELLY. Price $1.25. (D. Van Nostrand and Co., 25, Park Place, New York.)

(2) PERIODICALS.

ARGENTINA.

Revista Telegrafica. $0.40 m.n. monthly. (Buenos Aires.)

FRANCE.

Comptes Rendus de l'Academie des Sciences. Weekly. 94 frs. per annum. (Gauthier, Villars et Cie., 55, Quai des Grands Augustins, Paris.)

L'Électricien. 1.25 frs. fortnightly; 23 frs. per annum, France. 30 frs. per annum, outside France. (H. Dunod, 47 and 49, Quai des Grands Augustins, Paris.)

L'Électricité. 1.50 frs. fortnightly; 25 frs. per annum, France. 30 frs. per annum, outside France. (Gauthier, Villars et Cie., 55, Quai des Grands Augustins, Paris.)

La Nature. 0.75 frs. weekly; 30 frs. per annum, France. 40 frs. per annum, outside France. (Masson et Cie, 120, Boulevarde St. Germain, Paris.)

Revue Générale de l'Électricité. 2.50 frs. weekly; 50 frs. per annum, France. 60 frs. per annum, outside France. (12, Place de Laborde, Paris.)

Revue Mensuelle T.S.F. 2.25 frs. monthly; 14 frs. per annum, France. 15 frs. per annum, outside France. (H. Desforges, 29, Quai des Grands Augustins, Paris.)

GERMANY.

Annalen der Physik. Fortnightly. 66 M. per annum. (J. A. Barth, 16, Dorrienstrasse, Leipzig.)

Archivs für Post und Telegraphie. (Reichspostamps, Berlin.)

Elektrotechnische Zeitschrift. Weekly. 20 M. per annum. (J. Springer, 23, Linkstrasse, Berlin, W.9.)

Jahrbuch der Drahtlosen Telegraphie und Telephonie. Monthly. 25 M. per annum. (M. Krayn, 30, Genthinerstrasse, Berlin, W.10.)

Physikalische Zeitschrift. 50 M. per annum, Germany. 64 M. per annum, outside Germany. (S. Hirzel, 2, Königstrasse, Leipzig.)

Zeitschrift für Drahtlose Telegraphie. 4 M. (Verbands Deutscher Radio-ingenieure, 137, Alexandrinenstrasse, Berlin, S.W.68.)

GREAT BRITAIN.

Electrical Industries and Investments. 1½d. Weekly. (13/16, Fisher Street, W.C.1.)

Electrical Review. 4d. Weekly. (4, Ludgate Hill, E.C.4.)

Electrical Times. 3d. Weekly. (Sardinia House, Sardinia Street, W.C.)

Electrician. 6d. Weekly. (Benn Bros., Ltd., 8, Bouverie Street, E.C.4.)

Nature. 1s. Weekly. (Macmillan and Co., St. Martin's Street, W.C.2.)

Post Office Electrical Engineers' Journal. 2s. Quarterly. (Electrical Review, Ltd., 4, Ludgate Hill, E.C.4.)

Radio Review. 2s. 6d. Monthly. (Wireless Press, 12/13, Henrietta Street, W.C.2.)

Technical Review. 1s. Fortnightly. (20, Tavistock Street, W.C.2.)

Wireless World. 6d. fortnightly. (Wireless Press, 12/13, Henrietta Street, W.C.2.)

ICELAND.

Elektron. (Published by Society of Icelandic Telegraphists, Reykjavik.)

ITALY.

Le Vie del Mare a dell' Aria. L. 2.50. Monthly. (Agenzia Radiotelegrafia Italiana.)

L'Elettrotecnica. L. 2, three issues monthly; L. 45 per annum, Italy. L. 70 per annum, outside Italy. (Milan.)

NETHERLANDS.

Radio-Nieuws. The organ of the Nederlandsche Vereeniging voor Radiotelegrafie. Fl. 7.50 per annum. Published monthly. (N. Veenstra, Laan van Meerdervoort 30, The Hague.)

Tijdschrift voor Electrotechnick. Fl. 8 per annum. Published monthly. (N. Veenstra, Laan van Meerdevoort 30, The Hague.)

NEW ZEALAND.

The Katipo. Official organ of the N.Z.P. and T. Officers' Association. Published monthly.

SPAIN.

Aire, Mar y Tierra. 9d. monthly; 9s. per annum. (Prenza Radiotelegrafica, S.A., Madrid.)

SWITZERLAND.

Journal Télégraphique. 0.6 fr. monthly; 5.40 frs. per annum. 6.00 frs. per annum, outside Switzerland. (Berne.)

UNITED STATES OF AMERICA.

Electrical Experimenter. $2.00 per annum. Published monthly. (233, Fulton Street, New York.)

Electrical Review (Chicago). $3 per annum. Published weekly. (W. Jackson, 542/53 Manadnock Block, Chicago.)

Electrical World. 15 cents. Weekly. (Tenth Avenue, at 36th Street, New York.)

Everyday Engineering Magazine. 15 cents monthly. $1.50 per annum. $2.00 outside U.S.A. (Everyday Mechanics, Inc., 2, West 45th Street, New York, U.S.A.)

General Electric Review. $2.00 per annum. Published monthly. (Schenectady, New York.)

Journal of the Franklin Institute. 50 cents monthly. $5.00 per annum. (Franklin Institute of the State of Pennsylvania, Philadelphia, U.S.A.)

Journal of the Washington Academy of Sciences. Twice monthly. $6.00 per annum. (211, Church Street, Easton, Pa., U.S.A.)

Popular Science Monthly. $2.00 per annum. (225, West 39th Street, New York.)

Proceedings of American Institute of Electrical Engineers. $10 per annum. Published monthly. (33, West 39th Street, New York.)

Proceedings of the Institute of Radio Engineers. Bi-monthly. $9.60 per annum. (College of the City of New York, 140th Street, New York.)

Radio Amateur News. $1.50 per annum. Published monthly. (Electrical Experimenter, 233, Fulton Stieet, New York.)

Scientific American. $5.00 per annum. (233, Broadway, New York.)

Scientific American Supplement. $5.00 per annum. (233, Broadway, New York.)

Telegraph and Telephone Age. $2.00 per annum. Published twice monthly. (253, Broadway, New York.)

AMATEUR SECTION

(A) Amateurism in Wireless Telegraphy.

(B) Directory of the World's Wireless Societies.

AMATEURISM IN WIRELESS TELEGRAPHY

THE PASTIME OF AMATEUR ASSOCIATIONS.

THERE can be no shadow of doubt that we owe mainly to the amateur the rapid development of wireless telegraphy during the late war.

Their little stations, dotted about all over the country, and in many cases equipped with nothing more pretentious than home-made apparatus, taught all concerned a number of very valuable lessons. These amateur efforts culminated in the birth of the early spark trench sets as well as in the supply of the personnel required to work them.

The crystal short-wave receiver ground station, in conjunction with a very simple spark transmitter fitted in an aeroplane, was extensively used for artillery observation throughout the war. These two pieces of apparatus were direct descendants of wireless gear constructed to suit the pre-war amateur, who got into the useful habit of pointing out defects as they were brought home by practical experience.

Nevertheless, despite all the developments that have been evolved, we remain still upon the borderland. To take a single particular instance, that of the thermionic valve, we are even yet far from having reached the limit of its sphere of influence in the radiotelegraphic world.

Pressure of routine work in commercial stations does not allow those engaged upon it to devote much time to experimental work; but the scientific amateur has almost unlimited scope in this direction.

For example, there is the great question of the part played by the upper atmosphere in wireless transmission about which Professor De Groot has carried out such invaluable work in the Dutch East Indies. By careful observation of signal strength from various stations, using a thermionic valve as a detector which can be adjusted to the same sensitiveness day by day by noting filament current and plate and grid voltages, more can be found out about the conditions ruling in the Northern Hemisphere. For comparison of signal strength it is best to employ the shunted telephone method in which signal strength is taken to be inversely proportional to the shunt resistance.

Equally interesting is the observation of Xs on different wavelengths under varying weather conditions and at various times of the day and night. A number of amateurs carried out such observations prior to the war for a British Association Committee, but the war stopped this work, and there still remains a great deal of leeway to be made up and a multitude of investigations to be made. A similar method to that already mentioned for observing signal strength can be employed. This possesses a decided advantage over the method employed before the war in which crystal detectors were used. As is well known, a powerful X ruins the sensitiveness of a crystal, whereas the efficiency of a thermionic valve is unimpaired by Xs.

Then measurements can be made on the electrical state of the atmosphere under varying weather conditions—work which is at present

carried out only at observatories by means of apparatus invented a good many years ago by the late Lord Kelvin. A valve method, however, can be employed.

In this case an ordinary well-insulated wireless aerial must be connected direct to the grid of a thermionic valve which is otherwise insulated from the earth. The grid will thus become charged to a potential corresponding to the mean height of the aerial above ground. The potential is measured by noting the change in plate current for the atmospheric change and producing the same change in current by disconnecting the grid from the aerial and connecting it to a suitable battery and potentiometer.

Such measurements would undoubtedly be of use to the Meteorological Office coupled with simultaneous readings of time, direction of wind, barometric pressure, amount of cloud, etc.

For high frequency measurements the thermionic valve is unsurpassed, and amateurs can conduct their own experiments on the efficiency of various types of inductances and condensers purely by taking comparative readings on a hot wire ammeter on circuits containing the particular inductances and condensers to be examined.

The circuits are arranged to have undamped oscillations produced in them by means of the valve, but the frequency must be adjusted to be the same throughout the experiments. The best method is to arrange a separate oscillating circuit of the valve to induce oscillations in the experimental circuit. The valve circuit is kept at a fixed adjustment for measurements of constant frequency.

For field work there are the interesting experiments carried out by Gen. Squier of the U.S. Army Signal Corps in the use of trees for transmission and reception. One of the methods employed was to drive a metal spike into the tree trunk and connect to one terminal of the transmitter or receiver whilst the other terminal was connected to an earth mat of metal gauze. Good results were obtained with quite small powers over distances of from 3 to 8 miles.

Apart from purely scientific work, it is most interesting to make friends through the medium of the ether. Many acquaintances were made in pre-war days in the amateur world by means of wireless, and the interchange of ideas which resulted bore the " rare and refreshing fruit " of healthy development of the science.

Wireless exerts thus a powerful democratic influence, because, no matter what the amateur's social status may be, he can meet his fellow enthusiasts on a common basis.

Cycle-dealers and gasfitters may hobnob with belted earls or crack jokes with K.C.s, between the hours of 7 p.m. and 1 a.m., or even later on New Year's Eve, an auspicious occasion when quite a number of us used to " see the Old Year out and the New Year in " by wireless in the good old peace-time days.

The lists of amateur societies which will be found in the following pages are destined largely to increase within the next twelve months, unless Governments are foolish enough to hamper the good work by vexatious and oppressive rules and legislation. Especially is it to be hoped that our own country, which owes so much to amateurism, will set an example in this matter, and leave to the enthusiast the utmost freedom that the public interests will allow.

DIRECTORY OF WIRELESS SOCIETIES

THE following list had been brought as up to date as circumstances would allow. Wireless Societies, however, are constantly being formed, and it is possible that particulars may have been received too late for insertion. Every endeavour has been made to present a thoroughly reliable list, but no responsibility can, however, be accepted for any possible inaccuracies.

AUSTRALIA.

Wireless Institute of Australia (New South Wales Section)—Malcolm Perry, Hon Sec., Box 2, King Street Post Office, Sydney, N.S.W. Tels., City 7349, Randwick 93.

Wireless Institute of Australia (South Australian Section)—Adelaide: Pres., Hambly Clarke; Hon. Sec., C. E. Ames. Age limit 16 years. Annual subscription, 10s. 6d., payable half-yearly. Official Organ: *Sea, Land, and Air.*

Wireless Institute of Australia (Victorian Section)—Pres., Major W. J. Sheldon; Capt. Roach-Pierson, Hon. Secretary, Melbourne, Victoria.

Wireless Institute of Australia (West Australian Section)—Pres., W. R. Coxon; Hon. Sec., G. W. Dean, 27, Holyrood Street, West Leederville, Perth.

CANADA.

Radio Club of Winnipeg—Kelvin Technical High School. Hon. Pres., J. M. F. Wilson, B.Sc., Pres., J. R. Foster, Secretary and Treasurer, E. A. Strong, Winnipeg. Number of Scholars: 40. Apparatus: 10 in. Induction Coil ¼-K.W. Transformer Audion Receiving Set Arc Generator.

McGill Wireless Association—Professor C. V. Christie, McGill University, Montreal, Canada.

Montreal Radio Association—Sec., D. C. Greenhill, 4171, St. Catherine Street West, Montreal.

DENMARK.

Radiotelegrafist forening (Skandinavisk) Copenhagen—Carl Johansgade, 14, Secretary and Treasurer, R. Rasmussen. Formed September 8th, 1917.

GREAT BRITAIN AND IRELAND.

Wireless Society of London—Pres., A. A. Campbell Swinton, F.R.S., Sec., L. McMichael, 32, Quex Road, West Hampstead, N.W.6. Tel., Hop 1564. Official organ, *The Wireless World.*

Altrincham and District Wireless and Scientific Society—Pres., Major Hamilton, M.P.; Hon. Sec., W. N. Lambert, Breeze Crest, Plane Tree Road, Hale.

Barnsley Amateur Wireless Society—G. W. Wigglesworth, 13, King Edward's Gardens, Barnsley.

Birmingham Amateur Wireless Association—J. B. Tucker, "Lynwood," Ashleigh Road, Solihull, Birmingham.

Bristol Wireless Association—Pres., Rev. A. P. Rigby; Hon. Sec. and Treasurer, A. W. Fawcett, 11, Leigh Road, Clifton, Bristol.

Burton-on-Trent Wireless Club—Hon. Sec., R. Rose, 214, Belvedere Road, Burton-on-Trent. Subscription 5s. per annum.

Croydon Wireless and Physical Society—"The Polytechnic," Scarbrook Road, Croydon. Hon. Sec., H. T. P. Gee, C.P.A., 70, George Street, Croydon. Tel., Croydon 1581.

Derby Wireless Club—Hon. Sec., W. Bemrose, Littleover Hill, Derby.

Glasgow and District Radio Club—Sec. and Treas., R. A. Law, 7, Queen's Gardens, Glasgow.

Leicester Radio Society—Hon. Sec., W. T. Rowlatt, 7, Highfield Street.

Liverpool Wireless Association—Sec., S. Frith, 6, Cambridge Road, Crosby.

Manchester Wireless Club—Hon. Sec., J. C. A. Reid, 16, Hawthorne Avenue, Monton, Eccles, Lancs.

Newcastle and District Amateur Wireless Association—A. W. Bridges, 53, Greystoke Avenue, Jesmond, Newcastle-on-Tyne.

North Middlesex Wireless Club—E. M. Savage, "Nithsdale," Eversley Park Road, Winchmore Hill, London, N.21. Sub., 5s. per annum, full members; 3s., corresponding members.

Oxford Amateur Wireless Society (for Juniors)—Hon. Sec., F. Pickett, 29, Bartlemas Road. Maximum age, 18.

Plymouth Wireless Society—Pres., W. S. Templeton, M.A., B.Sc., A.M.I.E.E.; Hon. Sec., W. G. Terry, Plymouth Technical School, Tavistock Road.

Radio Scientific Society—Sec., P. Thomason, 7, Brazennose St., Manchester.

Sheffield and District Wireless Society—Pres., H. E. Yerbury, M.I.C.E., M.I.E.E., M.I.M.E.; Hon. Sec., L. H. Crowther, A.M.I.E.E., 156, Meadow Head, Norton Woodseats. Sub., 15s. per annum, full members, 7s. 6d., student members, and 5s. corresponding members. Meetings fortnightly, on Fridays at 7.30 p.m., held in Sheffield Municipal Officers' Club.

Stoke-on-Trent Wireless Club—Acting Sec., F. Shaw, 55, Alexandra Road, Longport, Staffs.

Three Towns Wireless Club—Pres., Major the Hon. Waldorf Astor; Hon. Sec., W. Rose, Brandreth Road, Compton, Plymouth. Sub., 5s. per annum. Affiliated to International Society of Radoists.

Wireless and Experimental Association—Hon. Sec., F. H. Gribble, 16, Peckham Road, London, S.E.

Wolverhampton Wireless Telegraph and Telephone Association—Hon. Sec., A. Lawton, Essington House, near Wolverhampton.

Woolwich Radio Society—Pres., Col. Cousins, C.M.G., R.E.; Sec., J. M. Ellam, 27, Nightingale Place, S.E.18.

HOLLAND.

Nederlandsche Vereeniging voor Radiotelegrafie—The Hague, Sec., J. Corver, 162, van Aerssenstraat.

Vereeniging van Radiotelegrafisten ter Koopvaardy—Sec., B. Moul, Sleepskillingstraat, 6a, Rotterdam.

ICELAND.

Technical Society of Iceland—Sec., Otto B. Arnar, Reykjavik.

NEW ZEALAND.

New Zealand Amateur Wireless Association—Prof. T. H. Laby, Canterbury College, Christchurch, New Zealand.

New Zealand Amateur Wireless Club—F. Kellegher, Sec., 19, Adams Terrace, Wellington.

New Zealand Wireless Institute—Sec., J. O. Taylor. Minimum age 18. Annual subscription: Full members, one guinea; students and country members, 10s. 6d. Official organ, *Sea, Land and Air.*

UNITED STATES OF AMERICA.

Akron Radio Club—Akron, Ohio. C. Brown, R.D. 25.

Albany Wireless Club—H. S. Maguire, 814, Lancaster Street, Albany, N.Y.

Alpha Wireless Association—Valparaiso, Ind. M. E. Packman, Pres.; J. S. Webb, Sec. and Treas., 757, Greenwich Street.

Amateur Wireless Telegraph Club of Calif—Capitola, Calif, Box 55.

Amateur Radio Association of New Bedford—New Bedford, Mass D. Tripp, 26, Ward Street.

Amateur Radio Research Club—St. Petersburg, Fla., Pres., Loren Davis; Sec., F. Klauman.

Amateur Wireless Association—Bozeman, Mont. M. Mitchel.

American Radio Relay League, Inc.—Hartford, Conn. Sec., K. B. Warner, 721, Main Street.

Ark. Wireless Association—Little Rock, Ark. 216, W. 20th Street. G. O. Ranch.

Armour Radio Association, Chicago, Ill.—R. H. Mathews, 1316, Carmen Avenue.

Astoria Amateur Wireless Association—Astoria, Oregon. E. P. Hawkins Pres., 556, Grand Avenue.

Atlanta Wireless Association—159, Capitol Avenue, Atlanta, Ga.

Austin Radio Club—Austin, Tex. C. R. Granberry, Sec., Box 663.

Bellevue Radio Chain—Lincoln Avenue, Bellevue, Pa. C. Wray.

Birmingham Wireless Association—1428, North 12th Avenue, Birmingham, Ala. Sec., H. L. Ansley.

Bloomfield Radio Club—Bloomfield, N.J. F. McKinney, 300, Glenwood Avenue.

Brown University Radio Club—Providence, Rhode Is. Sec. and Treas., D. M. Gordon, Wilson Hall, Brown University, Providence.

Burlington High School Experimental Station—Burlington, Iowa. Principal, Wm. H. Peters. Damped wave length 400 to 4,000 M. Normal wave length 500 M. Day range 750 miles. Power 1 K.W.

Capital City Radio Club—Washington, D.C., J. Gamble, 1101, Potomac Avenue, S.E.

Cape May County Radio Association—Wildwood, N.J. E. Schlichting, 224, E. Burk Avenue.

Carrollton Wireless Club—Carrollton, Ill. S. W. Pierson.

Catskill Radio Club—E. C. Hocmer, Jr., Catskill, N.Y., U.S.A.

Central Radio Association—Little Rock, Ark. J. M. Clayton, D.M.

Central Radio Association—Urbana, Ill. C.S. Hunt, R.R. 12.

Central Radio Association—Indianapolis, Ind. H. Silcox, D.M.

Central Radio Association—Chanute, Kansas. H. B. Williams.

Central Radio Association—Independence, Kan. J. Jakowsky, President.

Central Radio Association—St. John, Kansas. D. Sheperd, D.M.

Central Radio Association—Tiffin, Ohio. H. Buck.

Central Radio Association—Van Wert, Ohio. L. Young, D.M.

Chicago Wireless Association—Sec., Frederick D. Northland, 24, Scott Street, Chicago, Ill.

Cincinnati Wireless Club—1839, Hopkins Street.

Citrus Belt Radio Association—Pomona, Calif. Sec., H. Clewitt, 1006, S. Reservoir Street.

Colorado Wireless Association—Y.M.C.A., Denver, Colo. H. Whitman, 2252, Washington Street.

College of the City of N.Y.—N.Y. City. H. Kayser, 41, Convent Avenue.

Connecticut Valley Radio Club—Springfield, Mass. G. Beecher, 416, Allen Street.

Council Bluffs Radio Association—Council Bluffs, Ia. J. Dean, 1630, Douglas Street.

Crescent Bay Radio Associtation—1148, 5th Street, Santa Monica, Cal. T. J. P. Shannon, Pres., H. Bull, Sec. and Chief Operator.

Dallas Club—Dallas, Texas. Sec., B. F. Bridges, 118, South Poydras Street.

Detroit Radio Club, The—Detroit, Mich. C. Barton.

Dorchester Wireless Association—Dorchester, Mass. Sec., R. F. Lufkin 11, Grace Street.

Dot and Dash Club—E. Orange, N.J. T. Borthers, 38, Amhurst Street.

E. Buffalo Wireless Club—701, Walden Avenue, Buffalo, N.Y.

East Side Y.M.C.A. Radio Club—153, East 86th Street, Sec., F. X. Hayes.

East Tennessee Wireless Club—723, N. 3rd Street, Knoxville, Tenn.

Englewood High School Wireless Association—Chicago, Ill. A. G. Whitmer 452, W. 60th Street.

Erasmus Hall High School—Flatbush Avenue, Brooklyn, N.Y. Principal, J. Herbert Low.

Ever Ready Wireless Club—167, E. 71st Street, N.Y. City.

Experimental Club of Cincinnati—1214, Jackson Street, Cincinnati, Ohio.

Experimental Radio Association—Pittsburgh, Pa. Sec., B. Lozick, 16, Eureka Street.

Fargo Radio Association—Fargo, N.D. E. Hooper, Agricultural College.
Frontier Wireless Club—1034, Elmwood Avenue, Buffalo, N.Y.
Fruitvale Wireless Club—2510, Fruitvale Avenue, Chicago, Ill.
Ft. Wayne Radio Association—Ft. Wayne, Ind. M. Williams.
Glenside Wireless Association—Glenside, Pa. R. Harmer.
Grape Belt Radio Association—Brockcton, N.Y. Pres., and Acting Sec., H. A. Hiller, 139, Hanover Street, Creek, N.Y.
Hackensack High School Wireless Club—Hackensack, N.J.
Hamilton Radio Association—Hamilton. Ohio. S. Doron.
Hamlin Wireless Association—2729, Noble Avenue, Chicago, Ill.
Hartford Wireless Association—320, Wethersfield Avenue, Hartford, Conn. R. C. Palmer.
Hawkeye Radio Association—Ames, Iowa. H. K. Sels, 131, Hyland Avenue.
Hawkeye Radio Association of Iowa—Lamoni Iowa, A. B. Church, Lamoni.
Hawkeye Radio Association—Toledo, Iowa. R. Batcher.
Helena Wireless Club—Y.M.C.A., Helena, Mont.
Hoosier Radio Club—Indianapolis, Ind. N. Watson, 204, Hamilton Avenue.
Hyde Park High School Radio Club—Chicago, Ill. Asst. Principal, C. H. Smith.
Institute of Radio Engineers—Alfred N. Goldsmith, Ph.D., Sec., C.C.N.Y., 140, St., and Convent Avenue, New York.
Inter City Radio Association—Berkeley, Calif. J. E. Buckes, Sec., 2108, Parker Street.
International Society of Radoists—Executive Headquarters, Omaha.
Ithaca High School Wireless Club—Ithaca, N.Y.
Kaw Valley Radio Association—Topeka, Kansas. Pres., W. A. Beasley; Sec. and Treas., S. P. Kingman, 1522, Mulvane Street.
Lewiston Radio Club—Lewiston, Idaho. G. Eaves.
Los Angeles Radio Association—Los Angeles, Calif. Los Angeles High School—H. Roome, Sec.
Louisville Radio Club—1410, Starks Buildings, Louisville, Ky.
Luverne Radio Club—Luverne, Minn., Sec., N. A. Canfield.
Mahoning Valley Radio League—Niles, Ohio. L. Kovalik, 322, Hunter Street.
Manchester .Radio Association—South Manchester, Conn. Sec., E. Dowling.
Mesa County Wireless League—Y.M.C.A. Grand Junction, Colo.
Miami Wireless Association—Miami, Fla. H. Henshaw, R.F.D.1.
Milwaukee Amateurs' Radio Club—Milwaukee, Wis., Teschan Laboratories, 2319-29, Wells Street—Pres., L. S. Baird; Sec., R. A. Teschan. Tel., West 395. Weekly meetings, 8 p.m., Thursdays, in Trustees' Room, Milwaukee Public Museum.
National Amateur Wireless Association—233, Broadway, New York City. Guglielmo Marconi, Pres; Acting Pres., J. Andrew White; Harry L. Walker, Secretary.
New England Amateur Wireless Association—Boston, Mass. Pres., G. R. Entwistle, Filene Building.
New London Radio Club—New London, Conn. P. Tilden, 23, Williams Street.
Norristown Radio Club—Main Street and Franklin Avenue. D. Walker, 552, Kohn Street.
Nyack Y.M.C.A. Radio Club—Nyack, N.Y. M.E. Robertson, 98, Piermont Avenue.
Oregon State Wireless Association—348, William Street, Portland, Oregon. E. L. Bischoff, Sec.
Peoria Radio Club—Peoria, Ill. Sec. and Treas., W. F. J. Fickeisen, 2420, Main Street, Peoria.

Pittsburgh Wireless Association—6031, Kirkwood Street, Pittsburgh, Pa.
Pomona Wireless Club—Pomona, Calif. Sec. H. Gates.
Port Huron Radio Club—Port Huron, Mich. C. Thompson, 815, Wall Street.
Power City Wireless Association—Niagara Falls, N.Y.
Progressive Radio Club—Chicago, Ill. Custodian, R. Slomer, 2434, Pear Port, Chicago.
Radio Association of Md.—Arlington, Md. Bancroft Park, R. Dimling, Sec.
Radio Club—Irvington, N. J. Secretary A. Oechler, 55, Linden Avenue.
Radio Club of Flint—Flint High School, Flint, Mich.
Radio Club of Framingham—Framingham, Mass. J. L. Reynolds, 135, Vanderbilt Hall, Sheffield Scientific School, New Haven, Ct.
Radio Club of Hartford—Hartford, Conn. M. Steele, 1202, Park Street, W. Hartford.
Radio Club of New Britain—New Britain, Conn. Sec., G. E. McCarthy, 20, Beloten St.
Radio Club of Thomson—Thomson, Ga. C. Morris, 104, W. Hull Street.
Radio Club of Union College—Pres., Ellsworth D. Cook, Schenectady, N.Y.
Radio Club, Y.M.C.A.—Trenton, N.J. C. T. Gordon, Sec. (This Club is temporarily disbanded pending erection of new Y.M.C.A. building.)
Radio Research Society of Mt. Vernon—Mt. Vernon, N.Y. W. Morgan, 149, Urfan Street.
Radio Telephone Club of Newhaven—267, William Street, West Haven, Conn., Pres., W. A. Talmage ; Sec., R. S. Jackson. Formed August 28th, 1919.
Rogers High School Radio Club—Newport, R.I. C.N. Clarkson, 17, Gibbs Avenue.
Sacramento Radio Club—Sacramento, Calif. Sec. R. Coover, 1613, 19th Street.
Sacramento Wireless Signal Club—Sacramento Calif, 2119, H. Street.
St. Paul Wireless Club—184, Walnut Avenue, Santa Cruz, Calif.
St. Louis Radio Club—3817, Olive Street, St. Louis, Mo. H. Blatterman.
Scott High Radio Club—Scott High School, Toledo, Ohio. Pres., E. H. Moll ; Sec., D. Buckingham. Apparatus : 2 K.W. Marconi Panel Set, short wave regenerative, 3-step amplifier for long wave and telephony ; bulb telephony set.
Senn Radio Association—Senn High School, Chicago, Ill.
Southern Wireless Association—1435, Henry Clay Avenue, New Orleans, La.
South Side High School—Newark, N.J. H. Wersfelder.
Springfield Wireless Association—323, King Street, Mass.
Spring Hill Amateur Wireless Association—2, Benton Road, Somerville, Mass.
Springfield Wireless Association—323, King Street, Springfield, Mass.
Spring Hill Amateur Wireless Association—2, Benton Road, Somerville, Mass.
State College Radio Club, State College, New Mexico.
Suburban Radio Club—Washington, D.C. C. Longfellow, Jr., 5515, Potomac Avenue.
Sylvan Engineers—Sylvan Grove, Kans. G. C. Hitchcock, Sylvan Grove.
Technical Wireless Association—E. L. Powell. 216, Spruce Avenue, Takoma Park, Md.
Technical Wireless Association—1206, E. Capitol Street, Washington. D.C.
Terre Haute Radio Club—Terre Haute, Ind., Sec., C. W. Cornutt.
Texas Wireless Association—1212, Prairie Avenue, Houston, Tex.
Topeka Radio Club—Topeka, Kansas. R. L. Morehouse, Hyland Park.
Tri-State Wireless Association—Memphis, Tenn. C. De La Hunt, Pres., 346, Winchester Avenue.
Troop 28 Boy Scouts—Epworth M.E. Church. 121, Nash Street, Hartford Conn.

Union County Radio Association—Roselle Park, N.J. 136, Westfield Avenue. Pres., F. H. Broome; Sec., R. E. Timbrook.

United Wireless Relay Club—Passaic, N.J., 102, High Street.

Waco High School Radio Club—Waco, Tex. P. Deeby, 535, Proctor Avenue.

Welcome Wireless Association—185, Chauncery Street, Brooklyn, N.Y.

Wichita Wireless Association—Butts Building. C. V. Williams, 525, N. Emporia Avenue.

Wildwood Radio Association—Wildwood, N.J. L. Chalmers, 125, Burk Avenue.

Wireless Association of Central Pa.—409, Kelker Street, Harrisburg, Pa.

Wireless Association, Ft. Smith—Pres., Jack D. Fink, Fort Smith, Ark.

Wireless Association of Keene—172, Elm Street, Keene, N.H.

Wireless Association of Montana—309, South Ohio Street, Butte, Mont.

Wireless Association of New Orleans—New Orleans, La., 2022 State Street.

Wireless Association of Penna—Odd Fellow Temple, Phila., Pa.

Wireless Association of Tuft's College—Medford, Mass.

Wireless Club of Y.M.C.A.—Gloucester, Mass. F. Essig, Y.M.C.A.

Wireless Society of Springfield—Box 562, Springfield, Mass.

Y.M.C.A. Wireless Club—Williamsport, Pa., 211, West Fourth Street.

Young Edison Society—Rogers, Ark.

Young Marconi's Wireless Association—Sec., P. H. Bolton, 1024, Erie Street, Youngstown, Ohio.

CODE SIGNAL
: SECTION :

(A) Introduction.

(B) Semaphore Signals :—

(i) from Fixed Stations.

(ii) by Flag Manipulation.

(C) Morse Code.

CODE SIGNALS

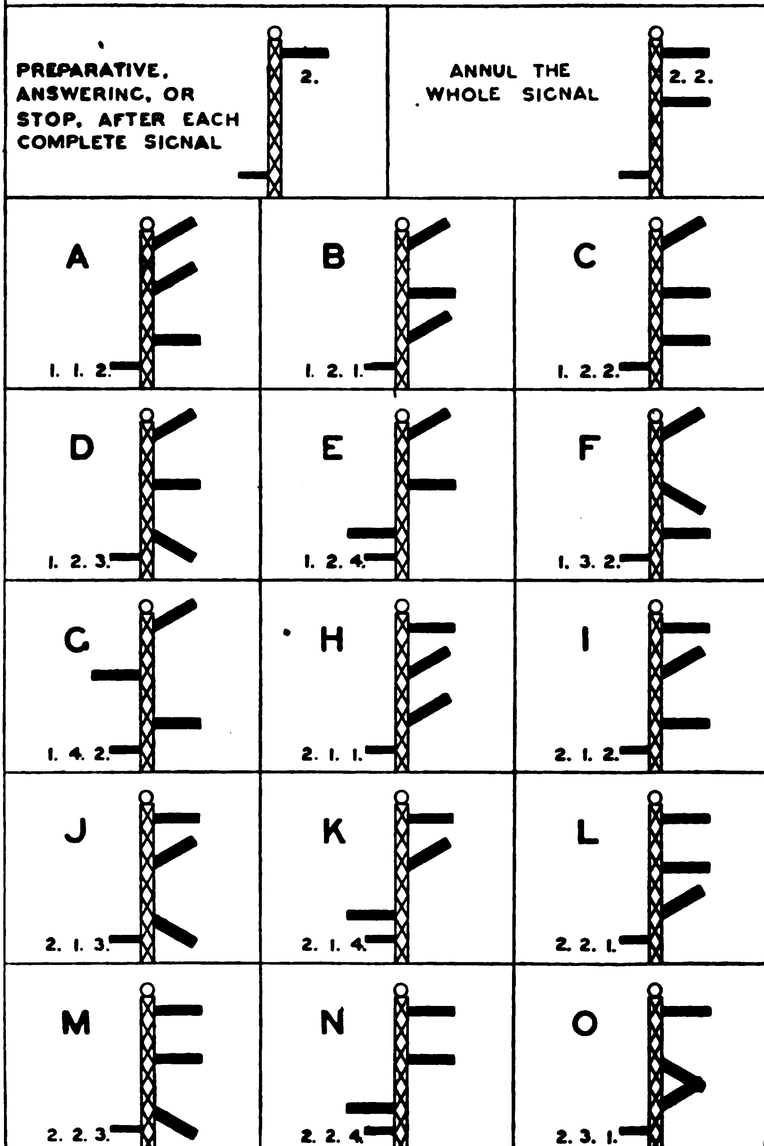
IN the following pages are shown general alphabetical tables for making international code signals by means of the fixed semaphore, and signals by means of the British movable semaphore. Through the courtesy of Messrs. James Brown and Son, Glasgow, we are able to reproduce from " Brown's Signalling " tables showing the British method of semaphoring by hand flags. In the British method the person intending to semaphore makes the international code signal V O X, " I am going to semaphore to you," and sets his semaphore at the alphabetical signal, with the indicator out, and waits until the ship to which the semaphore signal is to be made hoists her answering pennant, " Close up." Then he will proceed with the communication by spelling, making a momentary pause between each sign or letter; the arms are to be dropped between each word or group, the indicator only remaining out.

Should the answering pennant be dipped by the person taking in the signal, the last *two* words are to be repeated until the answering pennant is again hoisted " Close up," which denotes that the person taking in the semaphore signal is ready to read and write down the signal. It is to be dipped when a word is lost, and the person making the signal is then to repeat the *two* last words until the answering pennant is hoisted again " Close up."

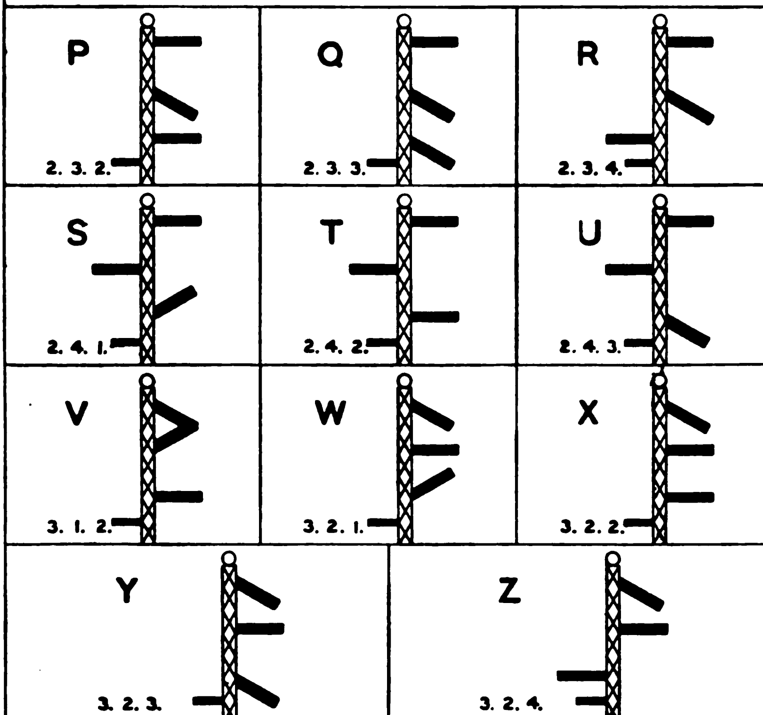
The British method of semaphoring by flags held in the hand which is shown is exactly the same as the British movable semaphore system, the positions of the apparatus which denote the letters, numbers, and special signs being identical in each case, the only difference being in the apparatus employed.

The French method of semaphoring by hand flags is based on the same principle as the British method, but the positions in which the flags are held to denote the letters, etc., are different.

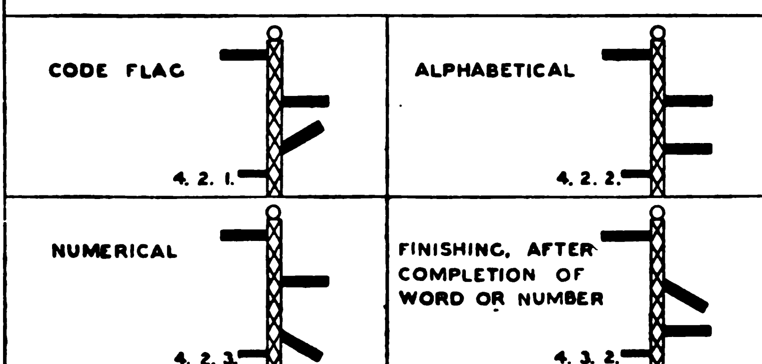
GENERAL ALPHABETICAL TABLE FOR MAKING THE INTERNATIONAL CODE SIGNALS BY MEANS OF DISTANT SIGNALS BY FIXED SEMAPHORE.

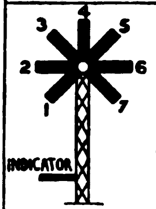
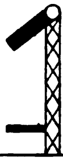
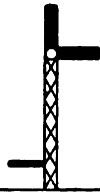
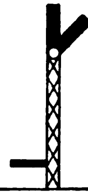
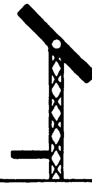
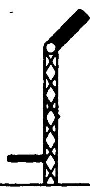
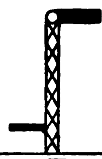
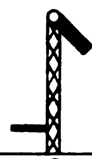
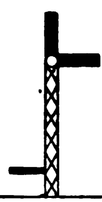
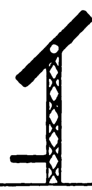


GENERAL ALPHABETICAL TABLE FOR MAKING THE INTERNATIONAL CODE SIGNALS BY MEANS OF DISTANT SIGNALS BY FIXED SEMAPHORE.

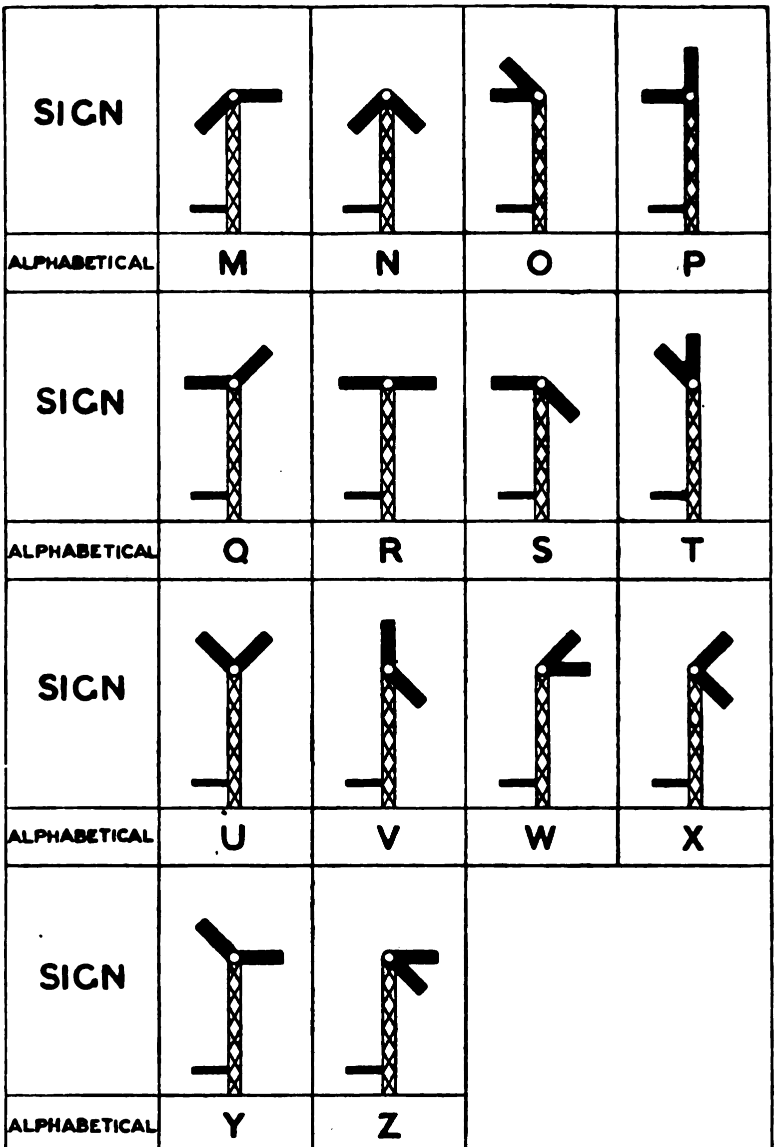


SPECIAL SIGNS.

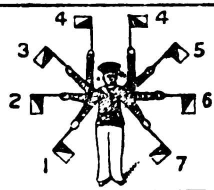


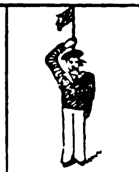
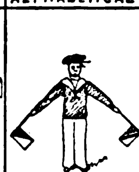
SEMAPHORE SIGNS	GOVERNING SIGNS			
	FULL STOP A·A·A 			
	REPEATED THREE TIMES IN QUICK SUCCESSION	ALPHABETICAL	NUMERICAL	ANNUL OR NEGATIVE
SIGN				
ALPHABETICAL	A	B	C	D
NUMERICAL	1	2	3	4
SIGN				
ALPHABETICAL	E	F	G	H
NUMERICAL	5	6	7	8
SIGN				
ALPHABETICAL	I	J	K	L
NUMERICAL	9	ALSO ALPHABETICAL	0	

NOTE.—IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE.

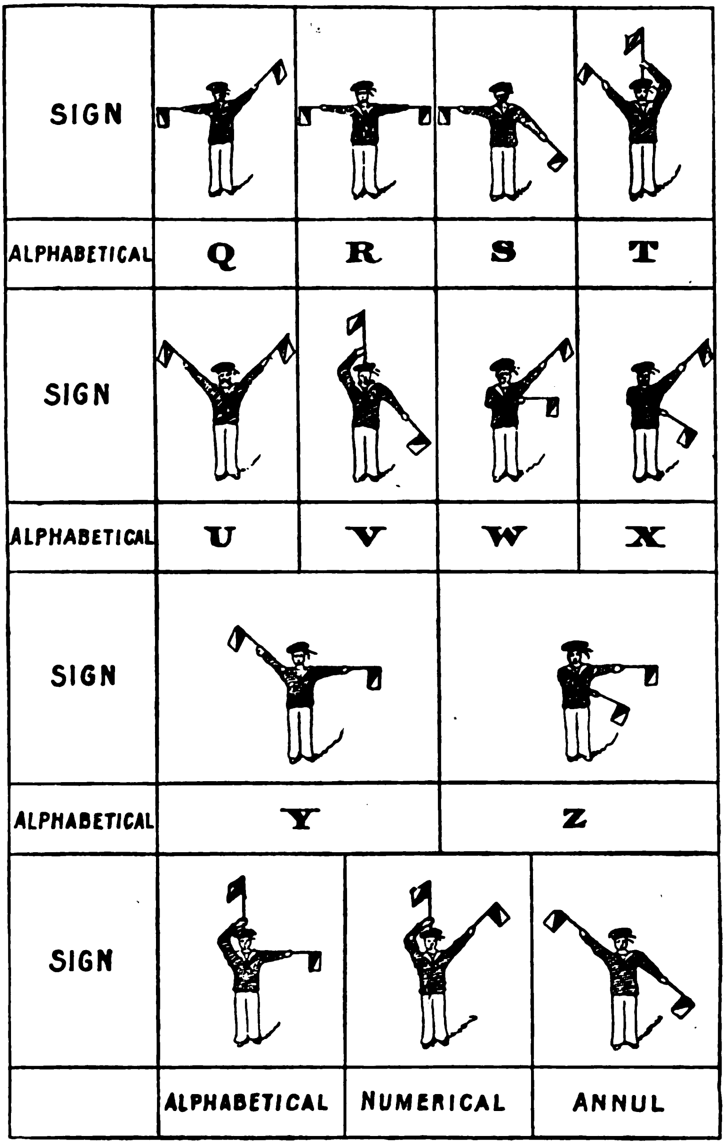


NOTE.— IF A NUMERICAL SIGNAL IS TO BE FOLLOWED BY WORDS, THE END OF THE NUMERICAL SIGNIFICATION OF THE SIGNS IS SHOWN BY THE ALPHABETICAL SIGN BEING MADE, INDICATING THAT SPELLING IS AGAIN TO COMMENCE.



SIGN				
ALPHABETICAL	A	B	C	D
NUMERICAL	1	2	3	4
SIGN				
ALPHABETICAL	E	F	G	H
NUMERICAL	5	6	7	8
SIGN				
ALPHABETICAL	I	J	K	L
NUMERICAL	9	ALSO THE ALPHABETICAL	0	
SIGN				
ALPHABETICAL	M	N	O	P

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THE MORSE CODE

The Morse code used in all countries except America is known as "Continental Morse," to distinguish it from the original code invented by Samuel Morse and now used by America. All American wireless operators, however, must necessarily be proficient in the use of Continental Morse, and so the latter is actually an international code.

Continental Morse is a dot and dash system, every letter or symbol consisting of a combination of these. Considering as an element either a dot or a dash, no ordinary unaccented letter is represented by more than four elements. Some punctuation signs, numerals and whole words are represented by more than four elements.

Rules for formation of Continental Morse code :

These rules apply irrespective of the speed of transmission.

(1) The time occupied by a dash should be equal to that occupied by three dots.

(2) The time occupied by the interval between two elements of one letter or other symbol should be equal to the time occupied by one dot.

(3) The interval between two letters in a word should be equal to the time occupied by three dots.

(4) The interval between two words should be equal to the time occupied by five dots.

Letters.

Continental Morse.		American Morse.	
a	· —	a	· —
ä	· — · —		
á, å	· — — · —		
b	— · · ·	b	— · · ·
c	— · — ·	c	· · ·
ch	— — — —		
d	— · ·	d	— · ·
e	·	e	·
é	· · — · ·		
f	· · — ·	f	· — ·
g	— — ·	g	— — ·
h	· · · ·	h	· · · ·
i	· ·	i	· ·
j	· — — —	j	— · — ·
k	— · —	k	— · —
l	· — · ·	l	———
m	— —	m	— —
n	— ·	n	— ·
ñ	— — · — —		
o	— — —	o	· ·
ö	— — — ·		
p	· — — ·	p	· · · · ·
q	— — · —	q	· · — ·
r	· — ·	r	· · ·
s	· · ·	s	· · ·
t	—	t	—
u	· · —	u	· · —
ü	· · — —		
v	· · · —	v	· · · —
w	· — —	w	· — —
x	— · · —	x	· — · ·
y	— · — —	y	· · · ·
z	— — · ·	z	· · · ·

Figures.

CONTINENTAL MORSE.		AMERICAN MORSE.	
1	• — — — —	1	• — — •
2	• • — — —	2	• • — • •
3	• • • — —	3	• • • — •
4	• • • • —	4	• • • • —
5	• • • • •	5	— — —
6	— • • • •	6	• • • • • •
7	— — • • •	7	— — • •
8	— — — • •	8	— • • • •
9	— — — — •	9	— • • —
0	— — — — —	0	———

Abbreviated Continental Morse Figures.

1	• —	6	— • • • •
2	• • —	7	— • • •
3	• • • —	8	— • •
4	• • • • —	9	— •
5	• • • • •	0	—

Punctuation and Other Signs.

CONTINENTAL MORSE.

Full stop	(.)	• • • • • •
Semicolon	(;)	— • — • — •
Colon	(:)	— — — • • •
Comma	(,)	• — • — • —
Note of interrogation, or, request for a repetition	(?)	• • — — • •
Note of exclamation	(!)	— — • • — —
Apostrophe	(')	• — — — — •
Hyphen or dash	(-)	— • • • • —
Fractional bar	(/)	— • • — •
Brackets. *This sign must be made both before and after the words which are to be bracketed...*	( )	— • — — • —
Inverted commas. *Must be made before and after the words which are to be quoted* ...	(" ")	• — • • — •
Underline. *Must be made before and after words which are to be underlined*		• • — — • —
Preliminary call. *To precede every transmission*		— • — • —
Double dash. *Generally called the "break sign." The signal separating preamble from address, address from text and text from signature*	(=)	— • • • —
End of message...		• — • — •
Error. *Means, "Erase." Some operators, however, use the repetition signal*		• • • • • • • •
Invitation to transmit		— • —
Wait	(AS)	• — • • •
" Received " signal		• — •
Distress call. *Formerly* CQD, *which some operators may still use*	(SOS)	• • • — — — • • •
" All stations "	(CQ)	— • — • — — • —
End of work	(SK)	• • • — • —

Punctuation and Other Signs.

AMERICAN MORSE.

Full stop	(.)	· · — —· ·
Semicolon	(;)	· · · · ·
Colon	(:)	—· — · ·
Comma	(,)	· —· —
Note of interrogation	(?)	—· · —·
Note of exclamation	(!)	— — —·
Apostrophe	(')	· · —· · —· ·
Hyphen	(-)	· · · · · —· ·
Dash	(—)	—· · · —· ·
Fractional bar	(/)	·
Bracket (begin)	(( )	· · · · · —·
Bracket (end)	( ))	· · · · · · · · ·
Inverted commas (begin)	(")	· · —· —·
Inverted commas (end)	(")	· · —· —· —·
Underline (begin)		· · — · —· ·
Underline (end)		· · — —· —·
Dollars	($)	· · · · —· ·
Pounds (sterling)	(£)	· · · · · · —· ·
Capital letter		·· · · —· ·
Decimal point	(DOT)	—· · · · —
Paragraph	(¶)	— — — —
Per cent.		—— · ——
&		· · · ·

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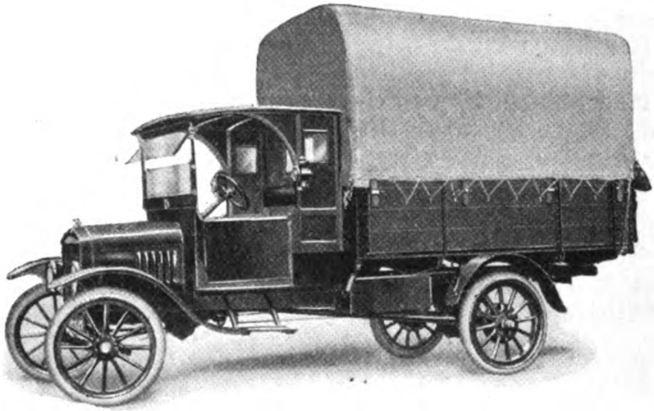
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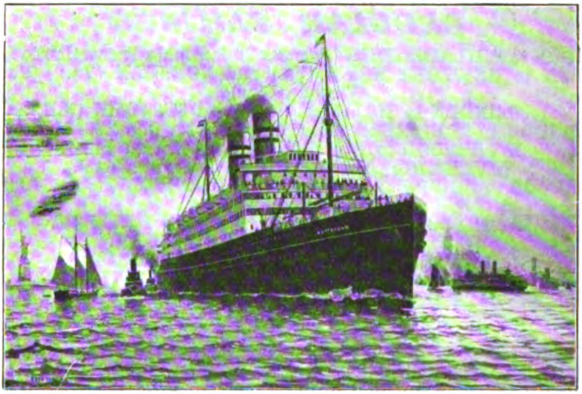
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American and Rio Plata Line.—New York to Monte Video, Buenos Aires, Rosario and Bahia Blanca.

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